MANAGEMENT VIEW

DO WE NEED EXCELLENCE in management in the public service industries? "I think we do, if we rest our conclusion on the hypothesis that the free enterprise system is worth preserving for those who come after us," Iowa-Ill. G.&E.'s Pres. Chas. H. Whitmore told the Columbia U.'s utility management workshop. "We cannot afford to do without excellence in management," he adds, advising: "We can attain it, provided only that we place excellence in management high on the list of priorities for the conduct of our day-to-day lives as managers."

SUPPORTING HIGHER EDUCATION is newly endorsed as one invaluable way to help preserve the free enterprise system. Aiming for more of this financial aid, the Independent College Funds of America has distributed a folder quoting top utility leaders (Cisler, Kennedy, Gerdes, Watt) on reasons why they, among some 180 utility companies in 26 states, are participating in the fund-raising efforts that help sustain nearly 500 independent liberal arts colleges across the nation.

WE HOPE YOU AND MANY OTHERS will continue to try to save our country from state socialism, wrote EEI Pres. Fleger recently to John J. Schiff, secretary of the Cincinnati Insurance Co. Mr. Schiff had appealed to the President of the United States "to exert every ounce of your influence to liquidate the unfair principles of the REA" (about to support the Hoosier Cooperative Energy, Inc. with a $60-million loan at 2% interest)—a venture which caused Mr. Schiff to predict that "nothing can drive the U. S. to state socialism faster." Mr. Schiff also urged Mr. Fleger to do "all in your power." ("A furtherance of state socialism," writes EL&P's Ralph Elliott on p. 47, "would be the end result" of two power projects with which the Administration insists on going forward.)

THE MERITS OF OBJECTIVE OPINIONS from any authoritative source will be conscientiously explored, said ConEdison's V-P J. Eliot McCormack, as ConEd informed the state P. S. Commission that it will comply with a directive calling for provision of "a second contingency design" for its high-voltage substations in high-density load areas in Manhattan. Work involved in carrying out the recommendations "will entail the expenditure of millions of dollars and miles of street excavations," the company said. When asked if the company would apply for a rate increase to pay for the improvement, a ConEd spokesman said "you can draw your own conclusions." (In the meantime, ConEd has replaced all circuit breakers of the type which suffered an insulation breakdown in the June 13 interruption, and utility and manufacturer are pursuing research efforts "to produce a superior insulation.")

JOINT ANTI-TRUST SUIT FILING, started by investor-owned utilities of Illinois and Indiana seems likely to form a pattern of action against the convicted manufacturers. In the first nine separate suits asking three-fold damages from 19 equipment makers, specified amounts of claimed damages were not set out, but will be developed in court trials. Complaints on ten additional items were to follow shortly, according to attorneys for the plaintiffs—Commonwealth Edison, Central Illinois Elect. & Gas, No. Indiana P.S. Co. and P.S. Co. of Indiana, Inc.

ANTI-BIAS RULE EXEMPTION sought by Carolina P.&L. Co. would avoid trouble from the utility's 750 suppliers and 49 subcontractors, CP&L's PR director, Jack Riley explained. (The exemption request applies to the presidential order calling for racial integration in firms having federal contracts, such as CP&L holds for furnishing power to a number of military bases.) Comments PR-Man Riley: "CP&L has very fair personnel practices and the personnel policy of a firm is far removed from whether the government gets the best goods and services for its money."

FUEL COST SAVINGS OF $19-MILLION in the single year of 1960—resulting from reductions in heat rates in the AEP System's 15 major power plants over the past ten years—have made possible the

sale in 1960 of over 27-billion kwh to 1.4-billion consumers at the lowest all-time average rate of just over 1.2¢ per kwh. Thus commented Pres. Philip Sporn when AEP's 450,000-kw Clinch River Plant was acknowledged to be the first in the world, over a full year's operation, to generate electricity below the heat level rate of 9,000-Btu per kwh.

ECONOMIC CLIMATE

RATE OF IMPROVEMENT in the national economy has slowed—something to be expected as business hesitates at its old high before penetrating into new ground. The vast majority of normal business indicators are pointing upward. To name a few: production, inventories, sales, new orders, shipments, employment, and personal income. Even the farm situation looks better. Output will fall off this year—a source of significant savings of government funds. Nevertheless, realized net income of farmers in the year's first half was at an annual rate of $12.6-billion—12 percent more than in the comparable portion of 1960.

FEDERAL BUDGET PICTURE is becoming clearer. Outlook for the current fiscal year is for a deficit of about $7-billion—and some experts won't be surprised if up to $10-billion is entered in red ink. Military spending will be accelerated, putting more cash into the economic lifestream. Anticipated growth in business lends easy plausibility to the President's claim that he will be able to submit a budget that is both balanced and realistic for fiscal 1963. But the chances are that if this is done, it will be because the Nation has expanded sufficiently to support, without federal deficit, an economy that pays enough in taxes to provide for spending about $90-billion a year.

GROWTH FOR SUPPLIERS to the utility industry is indicated for the balance of this year. Shipments of power boilers zoomed early this year; they are expected to exceed 100-million pounds of steam per hour (generating capacity) for the first time since 1952. Exports will set a new high. Steam turbine shipments and orders are expected to continue to follow a pattern of dipping (or level) orders and rising shipments for the rest of the year.

WASHINGTON INFLUENCE

AREA REDEVELOPMENT PUSH by the Administration, supported by legislation authorizing $100-million in loans to help finance industrial and commercial projects in rural areas and $175-million for loans and grants for public facilities in both rural and urban areas, is being steered by the Dept. of Agriculture in rural activities. The Dept. of Commerce will also implement the Act, guided by a 25-member advisory committee which includes representatives of labor, management, agriculture, local government and the public. Curiously, Commerce's committee has no representative from the investor-owned utility industry, long-time catalysts in community redevelopment effort.

SERVICES FOR BUSINESSMEN, "the fruits of a multi-billion dollar research program", in the Commerce Department are being promoted by a new campaign prepared by the Advertising Council. (Among the studies is a continuing one in the field of area development.) Newly released information of special interest in the electric power field: A survey of manufacturers on "Material Requirements for Construction of Stationary Thermal Power Plants;" a "World Survey of Electric Motors—1955-1959."

MILITARY BASES IN S. D. are to be supplied 16,000-kw of electricity by a group of four rural co-ops serving the territory in which the 150 launching sites and 15 control centers are located. Cong. Moss, commenting on the failure of Black Hills P. & L. Co. to get the contract, said this would in effect have subsidized the private utility to raid the territory developed by the coops.

INTEMPERATE ATTACK on investor-owned utilities was delivered on the House floor by Chairman Holifield (D., Calif.) of the Joint Atomic Energy Committee. In a diatribe triggered by the Hanford nuclear steamplant controversy, Holifield

asserted that the nation's progress in developing electricity from fission "has been bedeviled and obstructed by the privately owned electric utiilties." Instead of being "grateful" for federal A-power development, Holifield said, "they are only grasping and greedy," seeking to "expropriate the taxpayers' patent rights" in inventions made under federal contracts. Holifield also reiterated the familiar charge that utilities have been subsidized through allowances of accelerated amortization and allowance of tax-free dividends.

NEZ PERCE-MT. SHEEP license application hearings will reopen Sept. 12 for cross-examination of Wash. Public Power Supply System witnesses. By order of the FPC reversing the presiding examiner's exclusion of WPPSS testimony and exhibits, they are now admitted.

RECLAMATION SUPPLY CONTRACTS worth $1.6-million have gone to depressed areas. Since March, the Bureau has channelled roughly $2.5-million to firms in areas of substantial unemployment. The latest contracts are for aluminum conductor and insulators for transmission lines for Colorado River Storage Project and Trinity Division of CVP. Largest contract was for more than $1-million to Southwire Co., Carrollton, Ga.

COMPLETION DATA FOR PRDC has been extended to Dec. 19, 1961. PRDC's construction permit, first granted Aug. 1956, is for a 100,000-kw fast breeder reactor 30 miles from Detroit.

SAFETY GO-AHEAD has been given to the Saxton Nuclear Experiment Corp., Reading, Pa. The 5,000-kw reactor will be connected to a turbine generator of the Pennsylvania Electric Co. General purpose of the project is to conduct research and development involving operating a reactor under utility company conditions.

REDUCING EVAPORATION loss on reservoirs will be studied by Columbia University under a research contract from the Reclamation Bureau. Other universities are also working on this problem and on monomolecular films for reservoirs. The bureau estimates that annual evaporation losses from all fresh water sources in 17 western states is about 25-million acre-feet.

SOLUTION TO CONTROVERSY over Columbia Basin repayment has been recommended to the Interior Department by a Board of Consultants. If the Department, the Districts, and Congress approve, water user payments would be reduced by more than $2-million in the next 10 years. Interior figured these savings by comparing the Board's proposal with that offered by Reclamation in 1960. The Board was appointed by Undersecretary Carr last April to examine the Bureau's proposals and to get suggestions from water users. It recommends that Interior proceed as rapidly as possible with full development of the reclamation project.

JURISDICTION OVER POWER SALES by Southern California Edison Co. to the City of Colton for resale has been asserted by FPC in a reversal of a hearing examiner's decision. In an opinion signed by Chairman Kuykendall, FPC said that Edison's rate increases approved by California's Public Utility Commission were ineffective since the PUC had no jurisdiction over interstate rates. However, FPC agreed with Edison that it had no jurisdiction over pumping power sold to Colton since those sales were separately metered and billed. Edison must file with FPC its initial contract with Colton and the rate schedule as of July 1, 1954.

RUSSIAN POWER GROWTH in 1961 is to include addition of 7.8 million-kw to the USSR's electric power capacity. Construction will begin this year on new large power plants with a total capacity of 15.5-million kw, the Russians claim. The ultimate objective, according to Soviet sources, is "complete electrification of the country."

INDUSTRY SIFTINGS

LOADBUILDER MERCHANDISING IDEAS—Some new, anywhere, some new somewhere, they keep coming—the important thing! For guiding basic selling and advertising, for example, LOOK magazine shows in results from a study that brand selection and final purchase of appliances (large and small) is made by the man of

the family as often as 20 to 50 percent of the time, depending upon the item. Central Illinois P.S. is getting good results from a mobile "Electric Heating Display," traveling to more than 500 communities (pop. 1000 or less) in a 20,000-sq mile area. Los Angeles Dept. of Water & Power is recognizing outstanding commercial installations with "hallmarks" (bronze plaques for lobby display)—"All-Electric Merit Awards."

TAMPA ELECT. CO. has set up a new outdoor area lighting service for out-of-city residential and business consumers—providing electronic-eye type lights on wooden poles (with overhead wiring), to be installed, owned and maintained by the utility. And, many N. Y. state youngsters went to camp expenses-free the past summer—winners of N. Y. State G. & E. Co.'s 10th annual Youth Bulb Campaign (which sold over 300,000 light bulbs in two weeks).

A-POWER PLANTS UP TO 500-MW, in a full line expected to produce electricity at a cost equal to conventional power stations in the higher fuel cost areas of the U. S., are now offered to utilities at firm prices and with guaranteed net plant electrical output by General Electric. Featuring boiling water reactor systems of advanced design, the plants are believed to be the largest nuclear power stations yet offered to the electric utility industry.

ASSESSING COMPUTER TECHNOLOGY in a recent symposium on new uses for industrial control systems, Westinghouse emphasized its conviction that industry needs: single supplier responsibility and responsibility centered on the electrical equipment manufacturer. (As an indication of the effort such a supplier puts forth, participants were told of how, even before a rolling mill installation was even planned, a team of Westinghouse engineers worked a full year studying rolling mill operations.)

RANGE CHANGE—IN 1962? By next year, a Westinghouse study suggests, electric ranges may outsell gas ranges for the first time. Significance: a big psychological lift for the whole concept of "Live Better Electrically" . . . with the impending opportunity to point to range sales for a full year and announce "Today—Most People Buy Electric Ranges!" But, warns Westinghouse Utility Sales Mgr. R. Z. Sorenson: It will happen only if the electrical industry puts forth enough of an effort to make such a 50-year old dream come true. He notes the incentive: For every new installation, a potential average annual increase of 1200-kwh and $30 in revenue.

UTILITY ADVERTISING ETHICS—Questionable? Though Detroit Edison's E. O. George assured members of the Public Utilities Advertising Assoc. (in their last annual convention) that utility advertising could be considered about the least suspect in all industry from the standpoint of "ethics," the new PUAA Pres. has asked fellow members to take another look at the code of ethics the organization adopted 39 years ago. Among the aims established in 1922—"To consider the interests of the public foremost . . . to claim no more, but if anything a little less . . ."

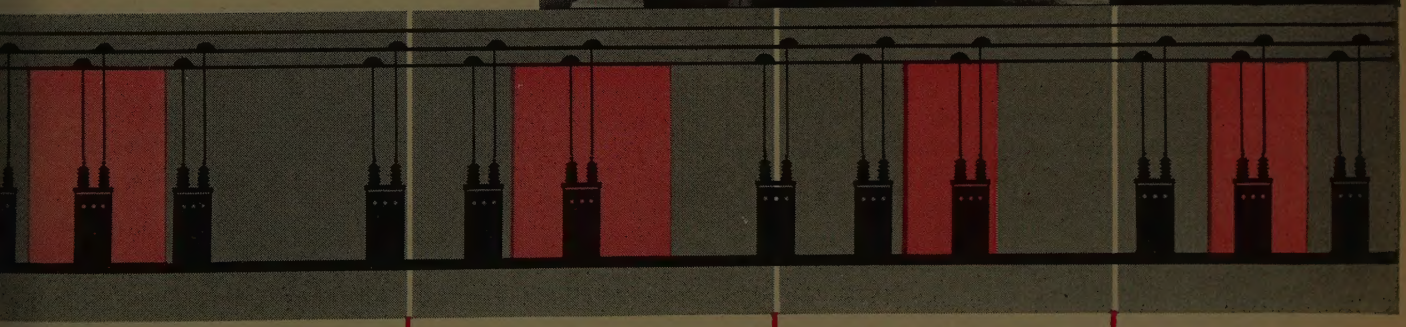
OWNERSHIP, OPERATION: PRIVATE—Who owns Utah P. & L. Co.? "I do! We do!", says ordinary people, representatives of the 15,000 individuals who are 90% of the Utility's common stock shareholders. (They are doing this effectively in a new corporate advertising campaign, prepared by Ad Director Will Bowman.) And, new franchise victories by Mississippi P.&L. (in McComb, voting 1,184-29) and Iowa P.S. Co. (in Sioux City, voting 12,162-4,041) were hailed as "exceptional" and "significant." Says Iowa P.S.: "The vote was particularly significant because Sioux City is in the Missouri river federal hydro power area, and firm power from this source cannot be bought by IPS for these customers because of the preference clause."

PRIVATE ENTERPRISE—ME TOO! Arkansas' governor and two U. S. senators (all Democrats, of course) all agreed on their never-ending support for private enterprise and the capitalistic system when they lauded the achievement of investor-owned Arkansas P.&L. Co. in erecting the new 348,000-kw Helena Station. (V-P Tom Fort of Westinghouse, which built the turbine-generator called it "the first, largest, most modern and only one of its type in the world.")

TEST SYSTEM—After completion of all assembly operations, a moving belt conveyor transports transformers through the automatic test system. Leads connecting the transformers to overhead dollies are attached before the transformers enter the test area. Power for each test is supplied...automatically ...by overhead bus at each test station.

CONTROL ROOM—Central control room houses all test station controls, test metering and recording equipment, and electronic rejection circuits.

RANSFORMERS



APPLIED POTENTIAL TEST

A low-frequency, high-voltage test of insulation quality between high and low voltage windings, and between windings and ground.

CORE LOSS AND EXCITING CURRENT TEST

Equipment automatically measures the core loss and exciting current of each transformer.

SOUND TEST

The audible sound level of every transformer is measured while the unit has normal excitation voltage applied.

CSP BREAKER TEST

When applicable signal light and breaker operation is checked under overload conditions for proper operation.

EL&P
ELECTRIC LIGHT AND POWER
THE MAGAZINE OF ELECTRIC-UTILITY TECHNOLOGY

UTILITY EMPLOYEES SELL OVER 200 AREA LIGHTS WEEKLY

How unique employee-promoted automatic "nightwatch" lighting program sold 7,781 area lights in first six months, representing $350,000 E.A.R.

By WILLIAM P. McPHERSON,
Commercial Sales Manager,
Carolina Power & Light Co.

A UNIQUE Company-supplied area lighting service by Carolina Power & Light Co. has received unexpected acceptance in the Company's 30,000-sq mi service area. In just a little over six months, 7,781 7,000-lumen mercury lighting units have been placed under contract. And they are being sold by non-sales company employees at the rate of better than 200 weekly.

A breakdown of the units sold to date indicates that 20% are for residential, 8% for industrial, and 72% for commercial applications. The total added represents an annual revenue of $350,000 from a new service which is relatively easy to promote.

Previously, when a customer was interested in area lighting, we suggested that it would be best for the customer to own, maintain, and control his own units. Over a period of several years, hardly 100 area lighting units of all sizes were installed by our customers on this "do-it-yourself" basis. It became evident that if we were to make a significant impression on the total market, a mass approach must be developed.

The Plan

After working with our Rate and Engineering Departments off and on for a period of a year, we developed a simple plan which has proved acceptable to our customers and quite satisfactory to our Company. If this plan has any genius, it is its simplicity.

Essentially the plan makes it possible for our customers to secure dusk-to-dawn area lighting service for $3.75 per unit per month regardless of whether the unit is mounted on a new or existing pole. A monthly charge of $.70 is made for each pole required on which there is no light. If transformers and primary facilities are required, a charge of 1.25% of estimated cost is part of the monthly rate. Few such situations to date have required this 1.25% charge.

Under the plan, our Company will own, maintain, and operate the facilities and will supply the electricity required to illuminate the lamps from dusk to dawn. We agre to supply the necessary mainte nance and restore illumination a soon as practical during regula working hours after being notifie by the customer that a lamp is no burning.

Installation

Under our Area Lighting Serv ice Schedule, we provide a clea 7,000-lumen mercury vapor lam using an open-bottom, Type V lu minaire with a 240-v reactor. Ou mounting brackets are 1¼ by 30 i and we use a mounting height approximately 25 ft utilizing a Cla 6-30-ft pole. The units cost th Company approximately $100.0 (without pole).

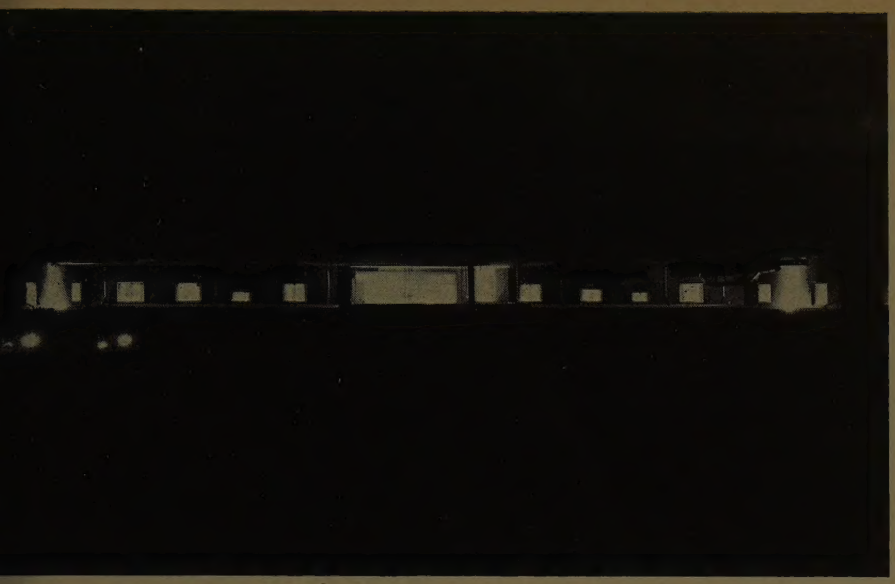
A recent check indicated tha approximately 80% of the lamp sold to date have been mounted o new poles. Approximately 25% the poles installed thus far have re quired anchors.

An area light can be installed two man-hours plus travel tim either one man for two hours two men for one hour. Where new pole is required, a three-ma crew is used for a period of on hour.

Commercial Installations

Considerable success has bee achieved among our commerci customers in the promotion of th light. Up to May 1, 1961 we sta 46% of our commercial area ligh ing quota in 33% of time. An a erage of a little better than tw

Promotion piece used by CP&L to promote new automatic "Nightwatch" lighting.



Without area light, nursing home exterior is dark and unattractive.

Area light at nursing home insures safety, adds nighttime beauty and safeguards property.

Area lights have been sold by CP&L employees to literally every imaginable type of commercial customer including the Columbus Memorial cemetery at Whiteville, N. C.

units has been installed on each commercial job under contract. A motel near Raleigh has contracted for 10 lights which have been installed by the Company at the rear of the buildings. Nine lights have been installed by the customer on pine trees at the front of the motel. The customer owns, maintains, and operates the nine units. One of the largest installations is at a chicken-plucking plant which contracted for 14 lights. Area lights have been installed by literally every imaginable type of commercial customer, including a cemetery.

Our Area Lighting Schedule became effective September 1, 1960, and the first promotion began the week of September 12 as a part of our 1960 Fall commercial lighting campaign. For three weeks we intensively promoted these lights with very little material to help us except to talk about the service. Contracts were written for 746 commercial units during this 3-week period.

Non-Sales Employees

On October 1, 1960, all non-sales employees of the Company were invited to enter a campaign which offered $3.00 in merchandise points for each unit sold. This employee participation proved so successful that it has been carried over in 1961 as a definite part of our sales program.

A few examples of the success achieved by a number of non-sales employees participating in this activity indicate the interest shown in this promotion. One district accountant has sold 141 units, a meter reader—69 units, an engineering aid —55 units, and a local representative—73 units. This is but typical of the interest being shown all across the Company. Considerably more than 500 of our non-sales employees are now participating. Bonus merchandise earned by employees up to April 11, 1961 totals more than $24,000.

An interesting sidelight to the present employee promotion is the fact that the success in a particular local area is often out of proportion to the apparent potential of that area in terms of customers, thus indicating that sales follow when there is interest, enthusiasm, and a reasonable incentive.

COMPUTER ANALYSIS ILLUMINATES FUTURE OF DISTRIBUTION VOLTAGES

An economic comparison between 13-kv, 23-kv, and 34.5-kv primary-feeder voltages has been made in an intensive study employing advanced digital-computer techniques. Results of this study shed light on a problem of growing concern.

By DAVID N. REPS, Distribution Engineer,
Westinghouse Electric Corporation, East Pittsburgh, Pennsylvania

AS ELECTRIC-UTILITY loads continue to increase, should the industry grow out of 13-kv and into 23-kv or 34.5-kv as a primary-feeder voltage?

Results of the study seeking answers to this all-important question show that:

(1) Given a free choice of any combination of system voltages, and considering new construction only, to serve residential load with very low saturation of air conditioning or electric heating, the combination of subtransmission and primary-feeder voltages yielding lowest system cost is 69/13-kv.

(2) Again, with load conditions excluding air conditioning or electric heating, the voltage combination of 69/23-kv yields a slightly higher system cost in all cases.

(3) When loads including high saturation of electric home cooling and/or heating are considered, then new construction cost for 69/23-kv becomes equal to 69/13-kv cost.

(4) Economics of 23-kv primary distribution are further improved if 138-kv rather than 69-kv is employed for subtransmission, thus favoring 138/23-kv over 69/13-kv for total-electric loads.

(5) Systems employing 34.5-kv as a primary-feeder voltage always cost more than 13-kv or 23-kv systems to serve residential loads.

Cost differences between the alternative system voltage for new construction, as shown in Fig. 1, generally are quite small. These small differences could only be ferreted out with digital-computer programs that first optimize system design, and then calculate costs accurately. Hence, only optimized alternatives are compared. But because the cost differences are so small, results of the study are subject to two interpretations: one might be called *negative*, the other *positive*.

Interpretations Differ

The *negative* interpretation of the study's results is that there is no clear-cut economic justification for the use of a 23-kv class of primary-feeder voltage to serve urban-suburban residential loads. Moreover, 34.5-kv as a primary-feeder voltage shows even less promise. This viewpoint can be bolstered by the knowledge that if the electric utilities stick with 13-kv, a distribution feeder operating at this voltage can carry 8000-kva, or roughly 1000 homes within an area of ⅓ to ½ square mile of heavily saturated total-electric living. Such a system could employ 60- to 80-mva eight-feeder distribution substations spaced at two-mile intervals—which certainly is a practicable system design and at most only a dollar or two higher in per-kva cost than the best that is theoretically possible, regardless of what the ideal optimum system pattern and voltages should actuall be in that specific cause.

The *positive* interpretation of th results graphed in Fig. 1 would b as follows: A 23-kv primary-feede voltage supplied from 138-kv sub transmission costs no more, in new system construction, than a 69/13 kv system—particularly as the satu ration of total-electric load in creases. Therefore, the adoption o a 23-kv class primary-feeder volt age probably can be justified fo many specific systems. Such sys tems would be those presently step ping-down from 23-kv to 4-kv. Thi conclusion can be bolstered with judgment factor that allows for th possibility of lower costs of 23-k class system components, relativ to 13-kv, as employment of th higher voltage increases.

Continuing the line of reasonin of the positive viewpoint, it can b argued that since a 23-kv primary feeder voltage proves-in for ne construction, then it might be justi fied even more positively for th systems that presently employ "con siderable" mileage of 23-kv as subtransmission voltage stepping down to a 4-kv primary-feede duty. The 4-kv could be eliminate and thus the sizeable cost advan tage of 23-kv over 4-kv for heavie load densities can be realized.

Three precautionary points mu be made, however, in the face o this type of rationalization:

The first already has been note it is that 138-kv is more economic than 69-kv as a supply to 23-k distribution, so that to gain the fu benefits of the higher primary feeder voltage, a higher subtran mission voltage would probably b required. This might mean co verting existing transmission subtransmission. Then, with th conversion made, a higher tran mission voltage would have to b in the picture.

The second precaution is that te or 20 years from today, the fractio of system investment represente by lines converted from subtran mission to primary-feeder duty w be quite small. That is, growth w make present investment in 23-k or 34.5-kv facilities rather insignif cant in terms of future investme requirements.

The third precaution concer the high cost of conversion. Urba

nd suburban load areas contain en or more miles of primary-cir-uit laterals for every mile of main runk. The existing 23- or 34.5-kv ubtransmission presently supply-ng 4-kv distribution substations enerally can be used as primary-eeder mains in the converted sys-em; but that still leaves ten times s much additional mileage of 4-kv o convert to 23- or 34.5-kv. This ype of conversion, as well as the hangeout of distribution trans-ormers and distribution substation acilities, takes place early in a ong-range plan, so that if present-vorth costing is used in the study, hese early conversion costs carry eavy weight compared with future xpenditures of the same amount.

Scope Of Analysis

The study simultaneously evalu-ates four voltage levels in an eco-nomic comparison of alternative electric power systems. Fig. 2 (a) shows the portion of the total sys-tem considered. Excluded from the analysis are the generating plants and the transmission lines required to reach the load area. Hence, all of the system contained within the load area is considered. Figs. 2 (b), (c), and (d) are one-line repre-sentations of the system covering the four voltage levels studied: transmission; subtransmission; pri-mary-feeders; and utilization-volt-age secondaries. Inclusion of 230-kv transmission, and its costs, satis-fies the desirable and necessary condition that all systems be car-ried back to a common "bus" in their economic comparison. The systems are new, and entirely of overhead construction. Only the conventional secondary utilization-voltage level of 120/240-volts is in-cluded in the analysis.

Method Of Analysis

The method of analysis begins with the optimization of distribu-

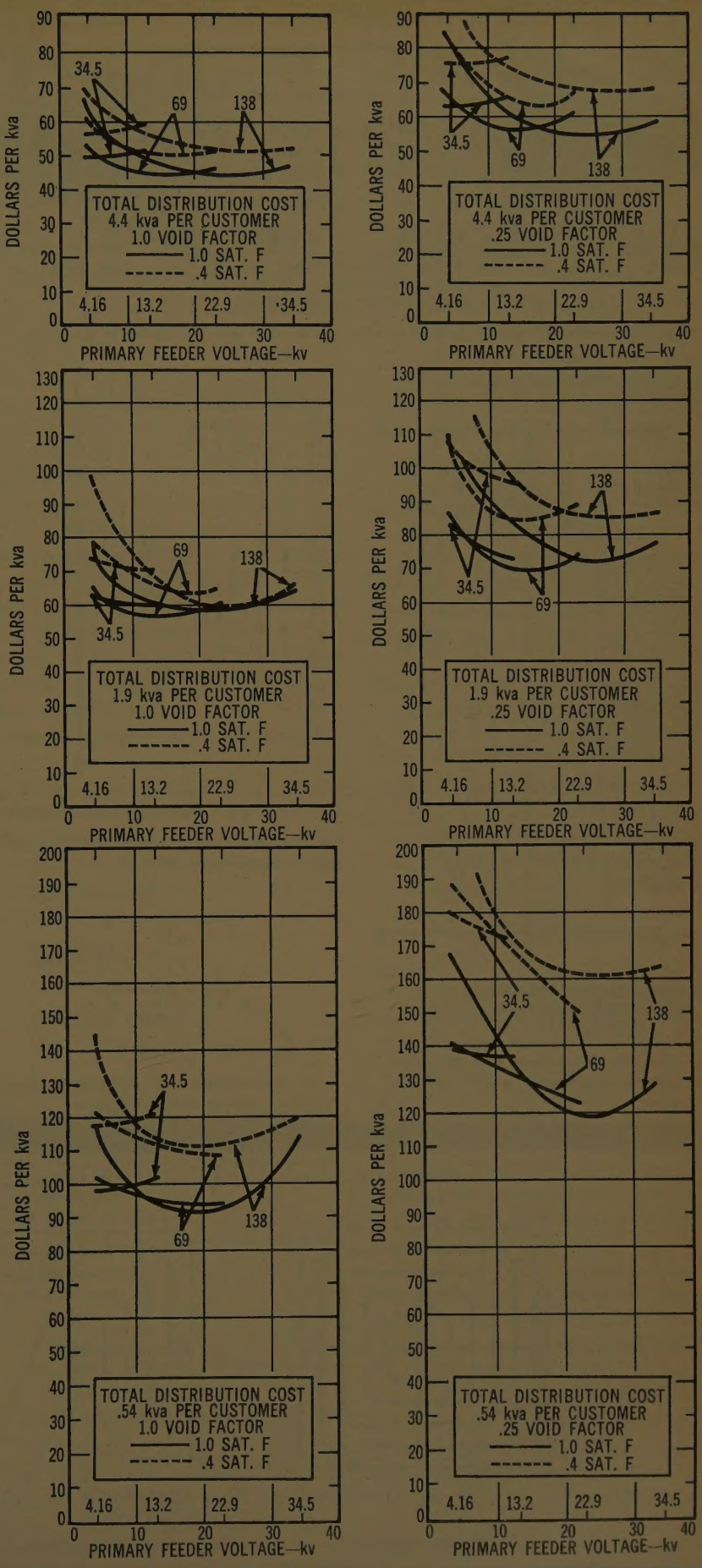


Fig. 1—Total distribution system cost, from 230-kv bus down to and including 120/240-volt secondaries, plotted from results of study.

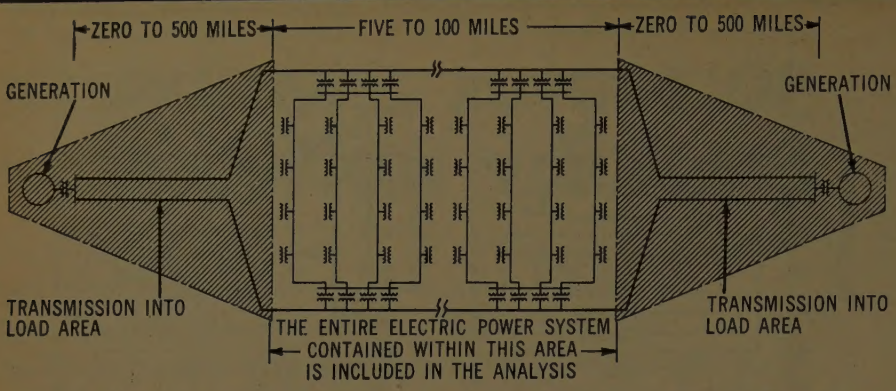


Fig. 2(a)—Unshaded area is portion of total system that was considered in the study.

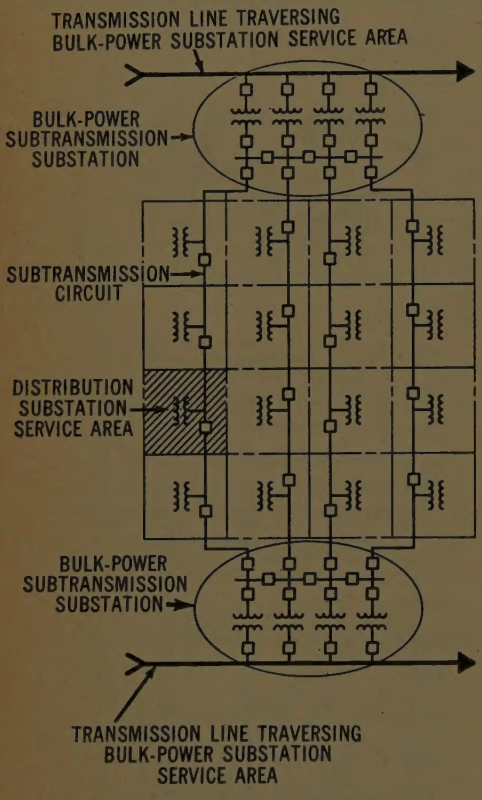


Fig. 2(b)—One-line representation of the transmission and subtransmission portion of the system studied.

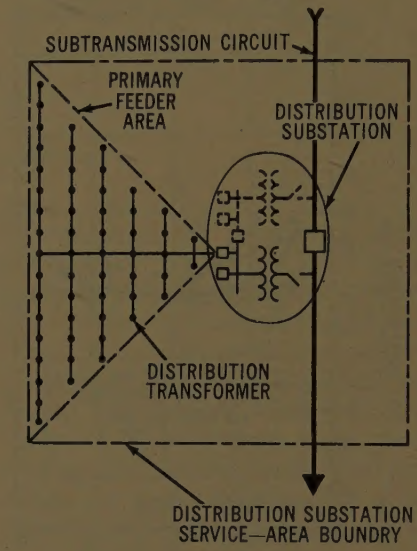


Fig. 2(c)—Diagram of distribution substations and primary-feeders studied.

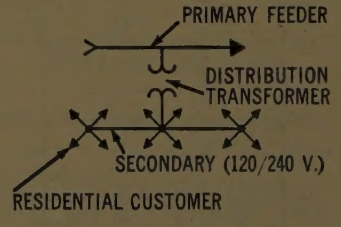


Fig. 2(d)—Diagram of distribution transformers and secondaries studied.

tion transformer and secondary d sign. For a given class of reside tial load to be served (kva pe customer demand) and for a give primary-feeder voltage, the lowe cost combination of distributio transformer and secondary is ca culated, and that cost is retaine for later incorporation into the tot system. Design or performan limits affect the number of co binations available for consider tion as the most economical desig These limits are: (1) The max mum allowable transformer pea loading; (2) The maximum allo able peak-load voltage drop to t most remote customer on the se ondary; and (3) The maximu allowable voltage dip occasioned the starting of a motor of specifi starting-current characteristics the most remote point on the se ondary.

Primary-feeder distribution su stations, and subtransmission a next considered. At these levels the system, individual custom kva demand loses its significan however, and load must be repr sented in terms of an area conce of load distribution, e.g., load de sity in kva per square mile, and t additional terms called "saturati factor" and "void factor," defin by curves and diagrams in Fi 3 and 4.

Saturation factor is the perce

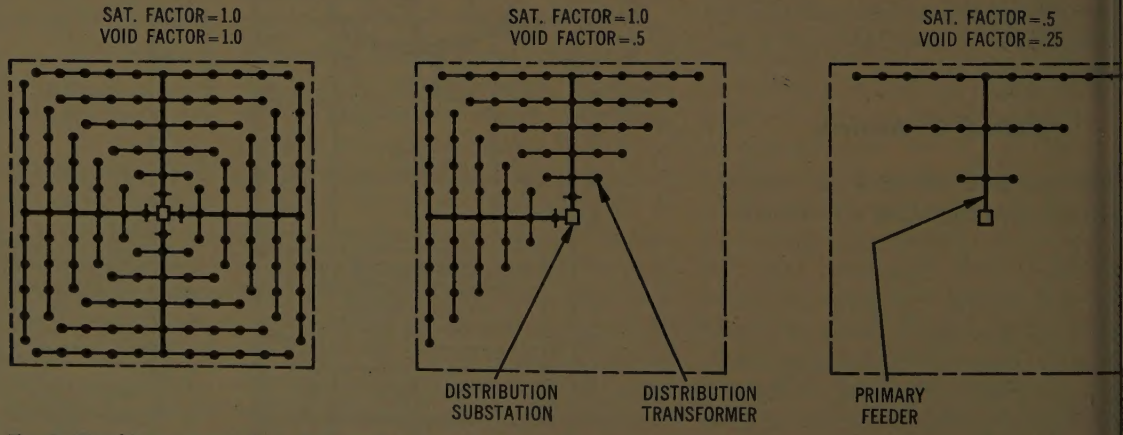


Fig. 3—Graphic representation of saturation factor and void factor.

aturation of optimum-rating dis-ribution transformers in the area erved. Saturation factor will be 00 percent if every lot in a pri-nary-feeder load area is occupied y a home having the specified kva iversified demand.

Void factor is the percent of the otal distribution-substation service rea within which load actually xists.

Specification of void and satura-ion factors, along with kva diversi-ied demand per customer and the ptimum distribution transformer-econdary combination, gives the *oad pattern* to be served by the ransmission, subtransmission, and rimary-feeder system. For each oad pattern considered, one specific ystem design gives the lowest cost esulting from employment of a articular combination of voltages. Optimized system design charac-eristics and costs are contained in he computer printouts, as shown n Fig. 5.

Then the required transmission acilities are designed into the bulk ubtransmission - substation load rea. This calculation is carried out nanually. Transmission facilities osted include the 230-kv lines re-uired to serve the bulk-power sub-tations, and the transformers and igh- and low-voltage switching at hose substations. Knowledge of he distances between, and the load magnitudes at, the bulk-power substations, is obtained from the computer printout. The inclusion and costing of transmission lines, transformation down to subtransmission voltage, and bulk-substation switching then permits ready calculation of the circuit costs and apparatus ratings and costs, for the transmission facilities required to complete the over-all system design.

Optimized Total System Costs

All systems represented by the curves in Fig. 1 are the lowest cost designs that can be obtained with that respective combination of subtransmission and primary-feeder voltages. The system cost totals indicated along the ordinates of the curves represent the combined cost of the following system components: secondaries; distribution transformers; primary-feeder mains; distribution substations; subtransmission lines; transmission facilities within the load area. Also included is the capitalized cost of losses in all of these system components.

The first observation that can be made is that, as should be expected, void factor and saturation factor (the determinants of load density) exert strong influences on total system cost. As these two factors approach unity, either individually as the other remains constant, or together, dollars-per-kva investment in the system decreases. This system cost behavior as shown in the curves of Fig. 1 is a quantitative expression of the principle that as load density increases, system investment per-kva of load served decreases. Two values of void factor—100 and 25 percent, and two values of saturation factor—100 and 40 percent, are illustrated. Results applicable to each of these respective values are sufficient to show system cost behavior as a function of these two attributes of the load.

Next, it will be observed that, for a given system load condition, the particular pair of primary-feeder and subtransmission voltages employed is highly influential in determining the cost of the optimized distribution system employing that particular combination of voltages. In general, as saturation factor decreases, i.e., as individual loads of a given size as viewed from the primary-feeder voltage level become more dispersed, per-kva cost differences between alternative voltage combinations increase. This same effect is observed for decreasing void factor, where as individual loads of a given size become more dispersed as viewed from the subtransmission voltage level, per-kva cost difference between alternative voltage combinations also increases.

Other observations that may be drawn from the curves of Fig. 1 are the following: in general, for a given system load pattern and subtransmission voltage, system cost as a function of primary-feeder voltage tends to follow a "U"-shaped curve such that there is an optimum primary-feeder voltage, i.e., one that results in a minimum-cost system, while values of primary-feeder voltage either above or below the optimum result in a higher-cost system.

A complete description of each of the optimized systems represented in the cost curves of Fig. 1 is contained in the printout sheets obtained from the digital computer. (See Fig. 5.) This design data includes two blocks of information: the input data used to determine the system design; and the output information describing the capabilities, ratings, and degree of utilization of each system component.

Discussion of the cost behavior

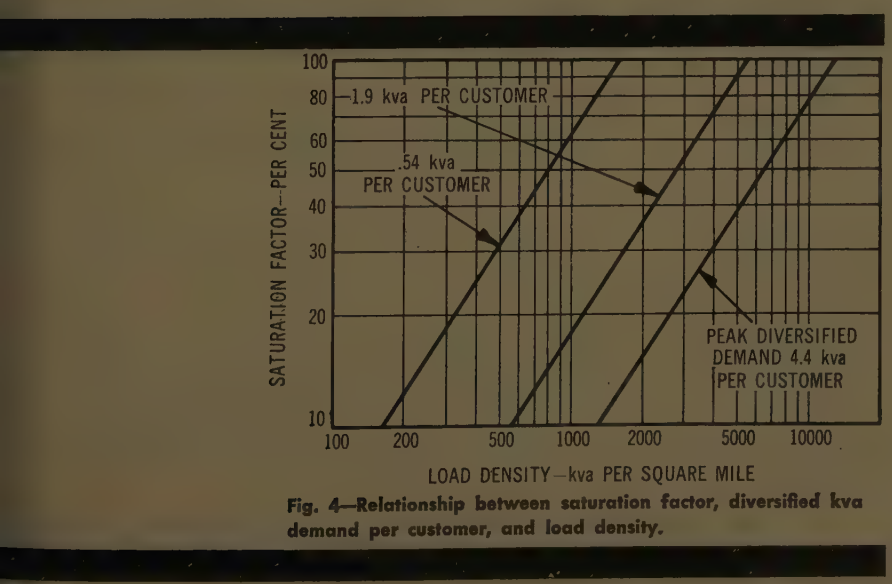


Fig. 4—Relationship between saturation factor, diversified kva demand per customer, and load density.

of all system components can logically begin at the utilization-voltage level. The economics of distribution transformers and secondaries principally depends upon individual customer kva demand, and primary-feeder voltage. However, let us quickly obtain a comparison between the economic importance of transmission, at one end of the voltage scale, and the distribution transformer-secondary components at the other end.

The per-kva cost of transmission within the load area depends principally upon load density. On the other hand, the economics of distribution transformers and secondaries is governed, for the most part, on individual customer kva demand and primary-feeder voltage. How, then, can the costs of these two remotely separated system components be compared on a common reference?

Such a comparison is made possible by arraying the optimized util

DISTRIBUTION SYSTEM PLANNING MODEL

DISTRIBUTION SECTION ELECTRIC UTILITY ENGINEERING DEPARTMENT

(a) SUB TRAN KV = 34.50 FDR KV = 4.160 PRI VOLTS SPR = 4.00 SEC VOLTS DROP = 2.30 PRI FDR CON = 40
SUB TRAN CON = 500 VOID FACTOR = 1.0 SAT FACTOR 1 = 1.0 SAT FACTOR 2 = 0.4 SAT FACTOR 3 = 0.1

	LOAD DENSTY KVAPSM	NUM SUB	SUB MVA	TRA MVA	(f) NUM PRI FDR	FDR KVA	PRI VOLTS DROP	(b) DIST TRAN KVA LD	DIST TRAN PTLD	CUS PER TRA	SEC CON SZE	(h) FDR LOSS COST	(i) TRA LOSS COST	(j) LINE LOSS COST	REGS ONLY COST	PRI SEC COST	SUB ONLY COST	LINE ONLY COST	TOT SYST COST	
(c)	5700.	5.	10.	10.	4	2458.	4.00	27.60	184.	12	4	2.61	2.16	1.71	0.	34.03	14.69	5.72	54.44	
	5700.	2.	32.	16.	13	2458.	8.00	27.60	184.	12	4	5.22	1.94	1.61	3.53	43.65	12.12	4.07	59.85	
	5700.		71.		29	2458.	12.00	27.60	184.	12	4	7.83			6.96	53.16	SUBSTATION EXCEEDS LIMIT			
(d)	2280.	5.	7.	7.	4	1798.	4.00	27.60	184.	12	4	2.58	2.33	1.69	0.	36.95	16.90	9.10	62.93	(g)
	2280.	2.	23.	12.	13	1798.	8.00	27.60	184.	12	4	5.16	2.09	1.59	4.25	50.20	13.41	6.15	69.76	
	2280.		52.		29	1798.	12.00	27.60	184.	12	4	7.75			8.40	63.36	SUBSTATION EXCEEDS LIMIT			
(e)	570.	5.	5.	5.	4	1127.	4.00	27.60	184.	12	4	2.56	2.62	1.68	0.	46.73	22.31	20.39	89.44	(l)
	570.	2.	15.	15.	13	1127.	8.00	27.60	184.	12	4	5.13	1.99	1.58	5.93	71.44	16.15	13.09	100.69	(m)
	570.	1.	33.	16.	29	1127.	12.00	27.60	184.	12	4	7.69	1.93	4.95	11.73	96.03	16.14	14.63	126.80	(n)

(k)

KEY:

(a) — Descriptive input information on load pattern and system design.

(b) — Distribution transformer and secondary design data for the optimum combination serving a load pattern having 1.9 kva per customer peak diversified demand.

(c),(d),(e) — Total distribution system design and cost for saturation factors of 1.0, 0.4, and 0.1, respectively.

(f) — Number of primary feeders emanating from distribution substation.

(g) — Distribution substation kva rating exceeds maximum allowable.

(h),(i),(j) — Capitalized cost of losses in dollars per-kva in primary feeders, distribution-substation transformer(s), and subtransmission lines.

(k) — Cost in dollars per-kva of supplementary feeder line-voltage regulator(s), primary feeder, distribution transformer and secondary, distribution substation, subtransmission lines, and total system.

(l),(m),(n) — None, one, and two stages of supplementary line-voltage regulation.

Fig. 5—Computer printout listing optimized system designs.

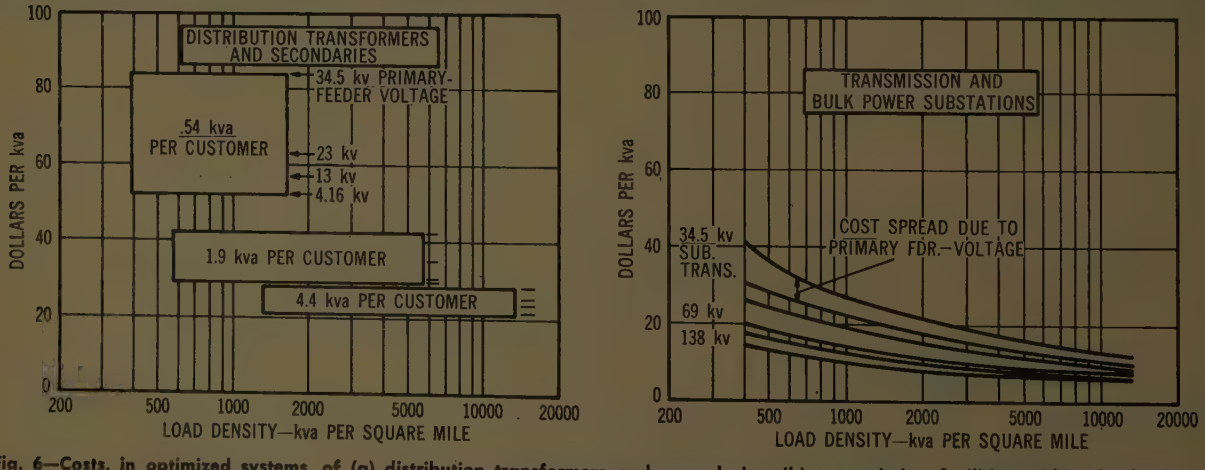


Fig. 6—Costs, in optimized systems, of (a) distribution transformers and secondaries; (b) transmission facilities within the load area.

ation-voltage designs as a function of load density as shown in ig. 6(a). This plot is accomplished y calculating the load density asso-ated with the optimum combina-on of distribution transformer and econdary serving each of the load atterns implicit in the curves of ig. 1. Each load pattern, as speci-ed by customer kva diversified emand, saturation and void fac-ors, can be translated into an quivalent load density expressed n units of kva per square mile. hus, in Fig. 6(a), the cost of the ptimum combination of distribu-on transformer and secondary for erving a given load pattern is lotted against the load density cal-ulated for that load pattern.

Costs of transmission are given in ig. 6(b). Comparison of Figs. (a) and (b) shows that, in gen-ral, distribution transformers and econdaries account for roughly hree times as much investment as vill be found in load-area trans-nission facilities. Thus, the eco-omic importance of distribution ransformers and secondaries is so reat that the cost of these two sys-em components obscures the cost ehavior of transmission, and all ther system components as well, n the cost totals plotted in Fig. 1.

The effect of subtransmission voltage on transmission economics s clearly evident. As subtransmis-sion voltage level increases, the cost per-kva of 230-kv facilities within the load area decreases. This cost behavior of transmission can be traced to the economical use, in optimized systems, of larger bulk-substation ratings along with higher subtransmission voltage. That is, when a higher subtransmission voltage is employed to serve a very extensive system area, transmission circuits would have to be carried to a fewer number of bulk-power substations to serve that area, thereby reducing transmission right-of-way requirements and total-area transmission construction requirements. Moreover, the per-kva cost of larger bulk-power substations would likewise be reduced, for two reasons: first, the larger size of those substations would enable circuit breakers of a given interrupting capacity to carry more load; second, the larger transformers employed would have a lower cost per-kva.

In order to examine the cost behavior of primary feeders, distribution substations, subtransmission, and transmission, the cost of distribution transformers and secondaries has been subtracted out from all the optimum systems derived from the computer techniques previously discussed. The results are displayed, for several of the voltage combinations studied, in Fig. 7. These curves illustrate several important economic characteristics of the electric power system:

1) The per-kva cost of distribution substations and primary-feeder mains combined is fairly independent of load density, and depends mostly upon the combination of subtransmission and primary-feeder voltages employed.
2) Bulk-power subtransmission substation cost increases only slightly at lower load densities.
3) The per-kva costs of transmission and subtransmission circuits increase appreciably at the lower load densities and hence these costs are principal contributors to the higher per-kva cost of systems in light load areas.

A brief return to the distribution transformers and secondaries at this point will round out the picture of the economic behavior of system components. By referring back to Fig. 6, it will be seen that, even though load density is not a direct determinant of the cost of distribution transformers and secondaries, the cost of these two system components in built-up areas with light-demand customers is appreciably higher than in built-up areas containing heavy-demand customers. Thus, the general increase in saturation of *all types* of electrical appliances tends to lower per-kva system investment.

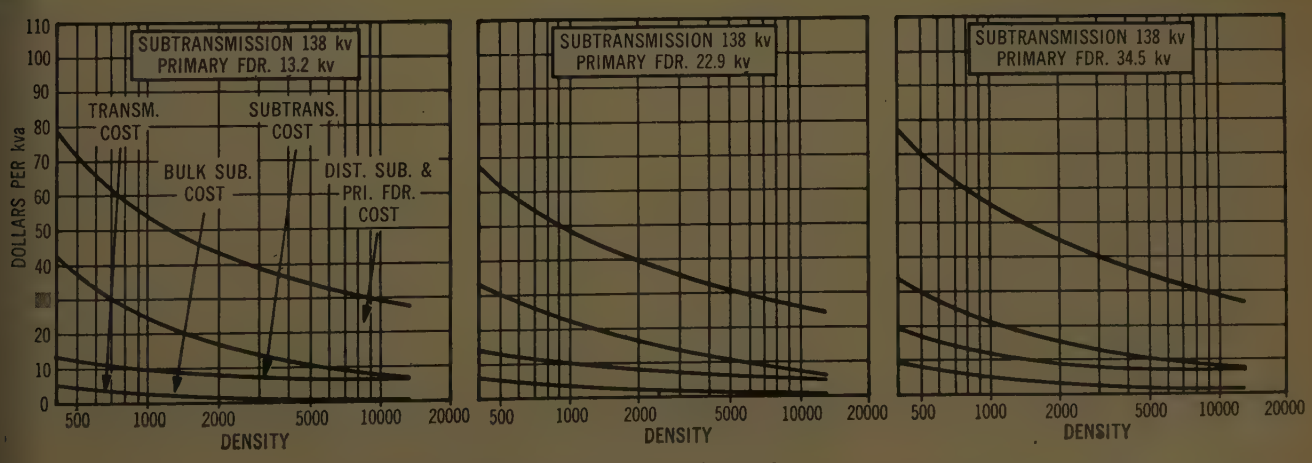


Fig. 7—Cost of system components excluding distribution transformers and secondaries.

WHAT THE CUSTOMER EXPECTS FROM THE POWER SALES ENGINEER

Here's some excellent advice for utility power sales engineers from a typical industrial customer.

By GEORGE J. MANN,
Director of Engineering & Maintenance,
White Laboratories, Inc.,
Kenilworth, N. J.

This is a sequel ot the article "What the Company Expects From the Power Sales Engineers" which appeared in the August 1, 1961 issue of EL&P.

SOME POWER SALES ENGINEERS think of their industrial customer plant engineers as rough, two headed monsters. I hope to prove to you that industrial customers are not so bad after all. My company, White Laboratories, Inc. is in the pharmaceutical business and is located in Kenilworth, N. J. We manufacture a great many drug products described as prescription specialties and also a line of "over the counter" products. Products advertised to the public are marketed by a subsidiary company known as Pharmaco. We make a full line of ointments, liquids, tablets and are the world's largest manufacturers of medicinal gum products.

Our plant is about 235,000 sq ft and has a connected load of about 1500 kva, provided with a transformer capacity of 2,000 kva, 4,150 v. We have a rather unique dust collection system in our manufacturing setup and two air conditioning units of 500 and 250 hp each.

Selling Power

In my discussion I am going to assume that the plant engineer is your contact with the customer and my discussion will revolve around him and your contact with him. "Help the plant engineer and you will eventually sell more power." I know this is what you are primarily interested in—selling power. This business of electricity is a lot like politics—"It's everybody's business." You power people have a stake in all businesses since you depend upon business companies and their employees for your livelihood. Since we have problems of mutual interest it is to your advantage to get along with and help each other. "If you want to sell more power, help the plant engineer."

We have a very peculiar business arrangement in some ways. You've sold me initially without any salesmanship involved. You have little competition, none in most fields. The only thing you can really sell is SERVICE and that puts you in the same situation as the plant engineer. He provides SERVICE—that is his function. I looked up this word "service" in the dictionary and I note they also stress quality in the use of service and listen to this definition, "the quality of that which is provided as our electric service is poor." The boys that wrote that dictionary must have had some power failures to use that as an illustration.

The Plant Engineer

It might be well for a moment to discuss that peculiar animal the plant engineer; who he is, and what he does. He is a crystal ball gazer that tries to guess what is about to break down in the near future. He has a scientific term for it calle PREVENTIVE MAINTENANC He is the father confessor and the same time the servant of ever body in the whole company. Wh there is mechanical trouble he usually in the middle of it. Se ously though, what are his areas responsibility and how can you into them? As I enumerate the examine them and ask yours what can I do to help the plant e gineer? There areas are:

1. Plant layout and design
   Specifications and planning.
2. Construction and installation
   New buildings, changes a modifications to existing structur with the problems of new install tion.
3. Maintenance, repairs, replac ment
   Repair and/or selective replac ment of equipment. Preventive pr grams.
4. Operation of utilities
   Distribution of all sources power. Uninterrupted, adequa service.
5. Plant protection
   Watch, fire, employee prote tion.

Obviously, you're in a utility o eration but if you examine the areas of plant engineer respon bility in greater detail, you w find you have a finger in every o of them. Your problem is to fi out how you can fit in to help. I only offered a few suggestions.

Two Categories

At this point I would like splinter my discussion into two d tinct categories. They are: 1. *Wh the power company can do for t plant engineer.* 2. *What you, t power representative, can do f the plant engineer.*

What can the power company for me? I hope I can stimulate yo thinking here so you can awak these sleeping giants.

1. I want cheap power. My b gest problem is to keep my pow bill at an efficient low. You shou constantly make improvements your generation and distribution power with this in mind. If you he make me an efficient producer, prosper and grow and use m machinery. This additional equ ment uses more power as my bu

Editor's Note: This article was adapted from a talk presented by the author at the Interstate Power Club in New York City. Certain parts have been deleted for brevity and clarity since they pertained to local personnel situations.

ness grows. It's a rare plant today where power usage isn't increasing and fast.

2. I want "freedom from power failure." This is the bugaboo of every plant engineer. This means that you must design better, safer, more weather-proof methods of

moving electricity into my plant. You must have duplicate equipment set up in your distribution, if needed. You must maintain adequate switchgear. Recent New York City power failures and their attendant problems should give increasing meaning to my statements on this problem.

3. I want good service. Full voltage, freedom from high peaks and lows, fast outside help on outside distribution if required with crews that are adequately trained and equipped.

Sell Your Services

A power company should sell its services. By that I mean, tell us by written word or through your representative what you offer besides a "monthly power bill." I am interested in finding out what services you have to offer so that I can look to you for help when I need it. No one can do everything—that's why there are two sexes—and that's why you have experts and staff people to help you and me, but why do you keep them under wraps? How about educating us a little by courses in the latest electrical usage? Public Service Electric & Gas Co. (N. J.) recently put on a lighting course for our plant area which I have found mighty stimulating and useful. There are many phases of electricity that could profitably be explored through one-day or several-day courses. These might include:

1. Safety in electricity usage.
2. Switchgear—selection and maintenance.
3. Distribution problems.
4. What's new?
5. Any specific phase uncovered by your field men after surveying the needs of your area.

The power company could put out bulletins, periodicals, movies, make speakers available for plant engineers' meetings, exhibits, etc. My last word to you on this is COMMUNICATE.

Power Representatives

So much for the power company. Now for you power representatives. What can you do for the plant engineer? You can first review some of my suggestions to your company and if they have merit, put them into orbit so that maybe some big boy upstairs will catch on to it as his idea and really push it. Your first duty to me is to help me reduce electrical costs and use power efficiently. This might sound crazy to you but I don't mean reduce my total power bill as such, I mean reduce my unit electrical costs. Am I wasting electrical energy, am I using what I am paying for? I am interested in the cheapest electric power I can get.

One Contact Man

You are my contact man with the power company. I only want one contact man, not 15, because I haven't time to tell my story to many different people. You must know your organization so you can go to the right person for information and get me the answer. In your help please try to be direct. Try to make up your mind as to the right answer and tell me why. Don't suffer from Hamlet's disease, you know, "to be or not to be, etc." Men in management are under constant pressure to make decisions. You will find few people high or low who enjoy the process. Any help you can give us is appreciated by the plant engineer because of his multitudinous duties.

My power representative should have a personality and stability above the average, he is more than just a salesman. If he is a real contributor he will almost be considered a fellow employee, a man to turn to on electrical difficulties, a consultant.

How To Reach Me

How do you reach the plant engineer? Initially until you've got solid rapport, make an appointment, ask for a general plant tour and don't skip corners. Try to meet the boys in the shop and utility operation. Did you bring your sales kit on what you have to offer? Try to leave me with one good idea or stimulate our thinking on improvement in one particular phase of our business. Try to visit the plant engineer at least three times a year so you can get to know his common problems and suggest their solutions from your common knowledge of similar installations. If you don't come up with something "concrete" to help, you're not going to get anywhere. Here are some areas that might bear investigation for changes and improvements: Load surveys, Power factor surveys, Voltage surveys, Lighting surveys (windows, paint, etc.), Wiring surveys, Protection—lightning, Capaci-

tors, Causes of frequent electric failures, Modernization, Automation, and Initial planning of new buildings, changes, etc.

You should try to keep me informed on: Policy changes, Emergency services, Rates—needed for budgets, Service, New lines—my area, New substations—my area, How to save $ $ $, and New equipment that I might use.

So now you've decided to help the plant engineer. Why don't you

(Continued on page 62)

HYDRO PLANTS HELP PROVIDE PEAKING CAPACITY ECONOMICALLY

Water storage contributes ten percent of peaking capability for integrated steam-and-hydro-generating system

By J. D. HOWARD, Vice President, Wisconsin Power and Light Company

THE FIRST PART of this discussion deals with some of the aspects and problems posed by system peaks and particularly the vagaries in historical data which make it difficult to estimate future demands.

All of us in the utility business recognize the importance of accuracy in predicting load trends and future demands as we cannot afford to be short of reserve capacity. Neither can we afford to have too great a reserve in plant capacity, because our investment and costs would then be too high.

Editors Note: This is the essential text of a paper presented at the 1961 American Power Conference.

A measured peak might be called a random number. It is not a true maximum peak unless all of the multitudinous factors which influence demands are just right to produce a true maximum demand. Some of the factors which influence demands are shown in Table 1.

In order to develop a rationalized historical trend of kwh and demands, all of the variables should be normalized. It is obvious that this is impossible to accomplish. However, it is essential to rationalize as many factors as can reasonably be resolved.

There may be some systems so ideally situated that they can accurately measure total coincident demands, and thus know their total system losses at the time of maximum system demand. WP&L cannot do this; so the maximum net kwh supplied the system during a clock hour is considered the peak system demand.

Weather Effect On Peak

The average temperature at the time of the WP&L peak system demand was found to be +22F. However, temperatures as low as —25F. are occasionally experienced in WP&L territory.

Fig. 1 illustrates the increasing influence that temperature has on load. Where one degree F made a

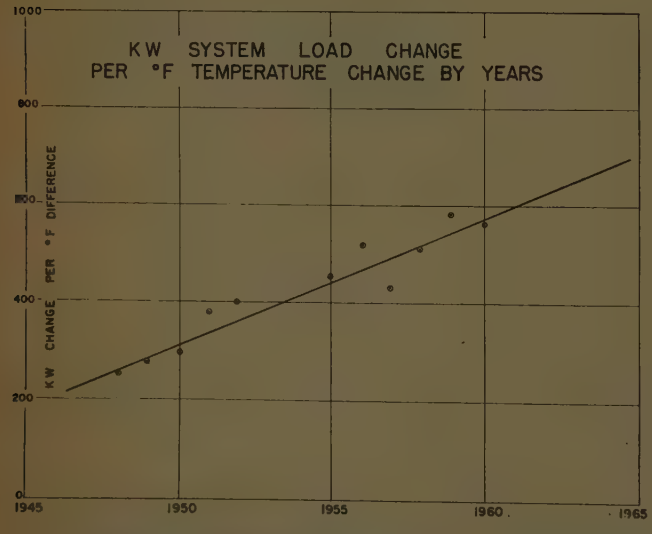


Fig. 1—Plot of the increasing demand per degree F change in temperature from 1945-65.

TABLE I

SOME OF THE FACTORS WHICH INFLUENCE DEMANDS

LOAD CHARACTERISTICS	Special Events
Property Acquisitions	
Addition of New Customers	WEATHER CHARACTERISTICS
Population Growth (And Shifts)	Day Of The Week
Business Expansion	Hour Of The Day
New Industries	Temperature
Economic Conditions	Wind Velocity
Business Cycles	Cloud Cover
Strikes and Layoffs	Humidity
Shifts In Patterns Of Customer Use	
New Developments, Application	SYSTEM CHARACTERISTICS
Habits Of People	System Changes And Additions
Holidays	Total Losses At Time Of Peak

change of about 300 kw in load in 1950, this figure has almost doubled by 1960.

To be more accurate in predictions of future loads it was necessary to include factors involving many variables. Normalization was made to incorporate acquisitions, temperature and system losses. Also, an attempt was made to recognize the important effect of economic conditions—so far it has been used only as a judgment factor in guestimating. The results of normalized-demand-trend study are shown in Fig. 2.

Duration Curve Envelope

WP&L is expected to maintain an annually compounding or logarithmic growth in their service area for many years. Our System Research Division has developed an interesting approach to further study on this subject. By grouping historical statistics into three segments for each twelve month period and feeding this into a digital computer, it should be possible to determine "absolute demands." This is still in the experimental stage but Fig. 3 shows the type of results that have emerged.

The duration-curve envelope shown in Fig. 3 is the type within which the WP&L system has operated for several years. The peaking problem is clearly represented by the fact that 10 percent of the total load exists only about 0.6 percent of the time. For 1960 only 52 hrs of the total 8,784 hrs experienced the top 40,000-kw of load. The deviation of the envelope was found to be less than 4 percent over a period of 9 yrs—based on "absolute demands."

Cloud Nine

Assuming the maximum-demand problem is solved, we might actually get to "cloud nine," if we knew what our total system losses were at the time of maximum demands.

Generating Plant

WP&L has four principal steam generating stations and 20 hydro plants. The principal steam stations, which are pretty well distributed over the service area, are: Nelson Dewey, Edgewater, Rock River and Blackhawk Plants—see Fig. 4. Only two of the hydro plants are of substantial size: The Prairie du Sac plant with a capacity of 31,000 kw operating at a 37-ft head; the Kilbourn plant with 9,500 kw at a 24-ft head operates on stream flow—so it is of little value in peaking. Both of these plants are located on the Wisconsin River.

The storage reservoir of the Prairie du Sac plant forms Lake Wisconsin, which is a popular recreation area. Because of regulations and potential complaints the pond can be pulled down about 0.6 ft. Each 0.1 ft of water generates 25,000 kwh; so the resulting 150,000 kwh represents 31,000 kws of firm capacity available for peaking over a period of about five hours.

One other major hydro plant supplying the WP&L system, Castle Rock, is operated by the Wisconsin River Power Co., of which WP&L is a one-third owner. With a capacity of 15,000 kw at a 30-ft head, and with considerable pondage and drawdown, this plant can be used for peaking.

Hardest Working River

The Wisconsin River has been considered the "hardest working river in the Nation,"—there are 26 industrial and utility generating plants on the river. The Wisconsin River and tributaries, drain an area of 12,300 sq miles or roughly one-fifth of the State. The river is 430 miles long and the storage reservoirs are concentrated in the upper 20 percent of the drainage area. The river has a total drop of 1,050 ft; 645 ft of this head is harnessed for power.

Storage Reservoirs

The reservoirs store 18-billion cu ft of water and have a surface area of 66,500 acres. The stored water is responsible for the generation of 175-million kwh per yr, and also contributes to firm capacity during peak periods. Consideration has been given to pumped storage in an additional reservoir, but this plan has not yet come to fruition at WP&L.

Normally about 10 percent of total system kwh generated and, also, 10 percent of the capability comes from hydro. 1960 was the best hydro

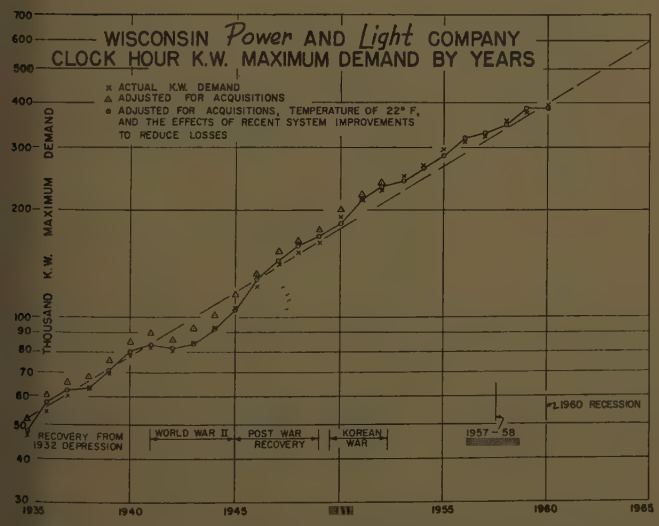


Fig. 2—Maximum demands with adjustments made for weather, acquisitions and losses.

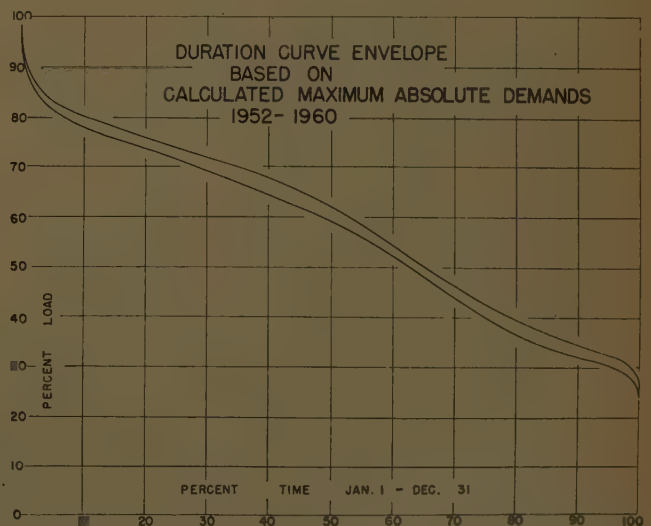


Fig. 3—Duration curve envelope based on maximum absolute demands.

Fig. 4—Wisconsin Power and Light Company Electric Transmission Map.

year in history, and the hydro plants generated 15.9 percent of the total kwh. The excess above a 10-yr average saved 37,000 tons of coal worth $285,000. Fig. 5 shows the division of load by source during a high-load 24-hour period—December 22, 1960.

Although the hydro capacity is a small part of the total, these plants, most of which were built some years ago, are producing power economically and are helpful for peaking.

Many economies are expected by being able to take advantage of the reserves of two companies resulting from a Power Pool Agreement that was executed on December 29, 1960. See April 15, 1961 issue of *Electric Light and Power* (p. 50) for information on the Power Pool.

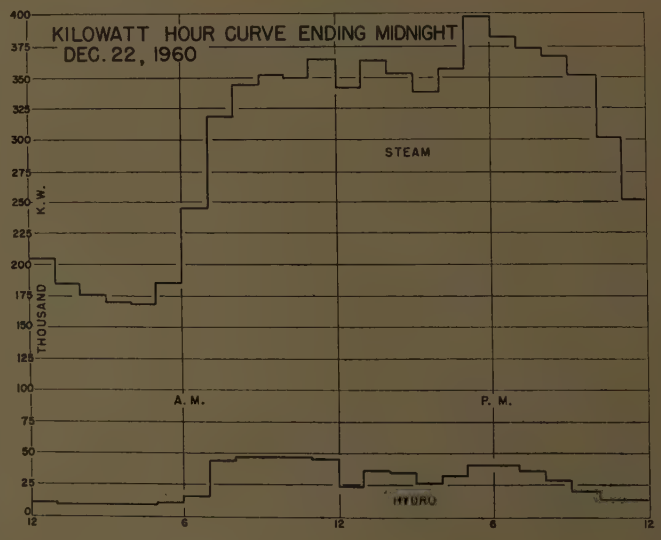


Fig. 5—Daily Load Curve for Dec. 22, 1960 showing division of load by source.

Harvesting wheat in a "soil" of fly ash at Connah's Quay power station in Flintshire.

CEREAL CROPS ON FLY ASH

Successful experiments in England at Connah's Quay power station prove that fly ash by itself is a good fertile medium.

FINE FARM CROPS are being grown on pure ash taken from the boilers of Connah's Quay power station in Flintshire. Many tons of grain, grass, clover and root crops have been gathered from the ash lagoons alongside the River Dee estuary.

These ash lagoons — where the sluiced ash from the stations is left to settle—are resulting in the reclamation of land from the Dee marshes, so that a two-fold purpose is being served: the creation of dry land where there was previously nothing but marshes, and the growing of useful crops on what was previously regarded as useless industrial waste.

Alongside the power station are the sites of several lagoons enclosed by earth banks or bunds, formed by pulling up the sand and mud of the marshes with draglines to form low banks with their tops above the highest tide level. Dutch engineers, using techniques acquired in the centuries-long battle against water in Holland, protected the banks with woven willow mattresses and stone revetting, so that the waters of the Dee would not wash the bunds away even at flood times.

The pulverized fuel ash from the power station boilers is mixed with water and in this form is piped to the lagoon, where the water seeps away, leaving the ash to settle until it eventually fills the lagoon — and then the agriculturists take over.

Connah's Quay station produces about 70,000 tons of ash a year from the 500,000 tons of coal it burns; this is enough ash to reclaim about ten acres of land a year.

Previously it had been considered that a top dressing of soil would have to be applied before crops could be grown on the ash, but technologists from Birmingham University carried out experiments and have proved that the ash by itself is a good fertile medium. The surface, compacted by the settling effect of the water, tends to be too solid, so good, deep ploughing is advantageous, but from then on everything is in the farmer's favor.

The farmer in this case is Mr. Wynne Jones, and his practical experience proved to be most valuable. Clover was sown on the ash, and produced a good crop in 1956. Since then, rye grass, white clover, mangolds and wheat have been successfully grown and Mr. Jones regards the lagoons of soft, gray ash as just one more batch of farm fields.

The consistency of the ash has improved from the fertility point of view as well. It is now heavily invaded by humus and fine root growths, all of which help to keep it in fine condition and receptive to seeds and roots.

If one walks across the sward of fine, luxuriant grass on one of the former lagoons, it is hard to imagine that it was once a mass of slimy gray ash, waist-deep in water. Yet a few hundred yards further on the

(Continued on page 62)

Editor's Note: This article is essentially the full text of the article "Cereal Crops On Fly Ash" published in the March-April 1961 issue of "ELECTRICITY," The Journal of The Electricity Council and Central Electricity Generating Board.

UTILITY MAN'S NOTEBOOK

Motorized Drive Speeds Meter Cover Cleaning

By GILBERT BARTAWAY, Meterman (Deceased)
Indiana & Michigan Electric Co., Ft. Wayne, Ind., AEP System

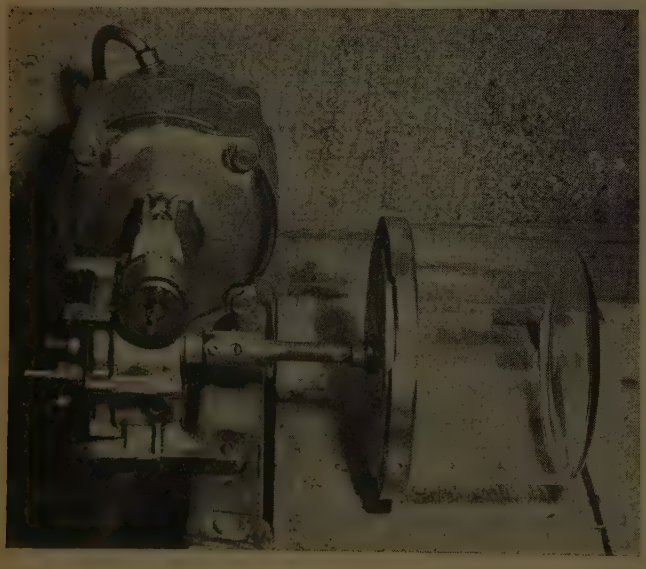
A geared-down motor drive made from scrap materials has proved better and faster than previously-used hand methods for removing hardened deposits of dirt and paint from glass meter covers. The new method permits cleaning of 50 covers per hour compared with only 20 previously. Total saving for 2,500 covers per year requiring special cleaning, is about 75 manhours.

Formerly, various methods had been tried with only slight success. A wide variety of solvents and cleaners had also been used, with a combination of brushing, rubbing, and scraping to remove the dirt and paint.

Now, the problem covers are removed from the meters and first soaked for a short time in a tank of detergent solution. The glass is then inserted over the adapter and rotated for easy cleaning with a rag or brush and some mild scouring powder. Any dirt or paint that does not come off readily can be removed by holding the sharp edge of a wooden scraper against the revolving glass, which is then cleaned up with a rag saturated with detergent and cleanser.

The unit was assembled by mounting an old adding machine motor and worm-gear drive to the top edge of the cleaning tank, as shown. Rotation of the meter glass is only 160 rpm, which is considered a safe speed. A footswitch was installed so the motor could be started and stopped without requiring use of the operator's hands. The motor and other metal parts were securely grounded.

Rotating a glass meter cover with this geared-down motor drive provides a good way to remove heavy dirt and paint on a production-line basis. A rag saturated with cleaning compound is held against the turning glass to remove the deposit. Device is shown mounted on edge of cleaning tank.



Adapters to hold the meter covers were made from old meter bases, and these were adjusted to insure a good fit with the covers. Each adapter was bolted to a ½-in. threaded extension that fits into the shaft coupling from the worm gear. The complete arrangement required about 8 manhours for construction. All of the parts and materials were salvaged from scrap, but other equipment, such as a portable drill and gear drive, could be adapted too.

Mobile Relay Tester Saves $1000 Per Year

By GEORGE J. MAMBOURG, Supervising Relay Engineer
Ohio Power Co., Canton, Ohio, AEP System

A fully equipped "Micro-Bus" station wagon has saved at least $1000 per year by bringing a complete relay testing and calibrating laboratory directly to most of the Company's stations. During the past year, the mobile bus has traveled more than 20,000 miles over the Company's service area.

Formerly, the same test equipment was packed in an automobile trunk and unpacked for each test set-up. The new tester keeps test equipment convenient, readily available, and provides protection from the weather. Test work can proceed without delay, even at stations with control and relay cabinets outdoors.

In March of 1959 the empty bus was purchased and a gradual program of equipping it as a test vehicle was begun. Since then it has proved valuable for satisfying all of the original objectives, which were:

1. To reduce the over-all time required for testing relays by eliminating the time required to set up test equipment.
2. To provide a warm, dry place to work on relays and make necessary calibrations and records, so work is not hampered by weather.
3. To include a place and orderly method for keeping drawings and instructions.

Formerly when this equipment was carried in the trunk of a car, each item had to be carried to the test site and set up as conveniently as possible. Frequently, meters and load boxes had to be placed on the floor of a control house or on gravel in a substation yard, occasionally in mud, snow, or rain.

Now, all of the former equipment is placed on a test bench in the bus and already connected for 95 percent of the relay testing jobs. This permits the use of many types of existing test equipment and connections. A specially-designed test bench with built-in equipment is neither necessary nor desirable. With this arrangement, any special connections can readily be made by changing the test setup inside

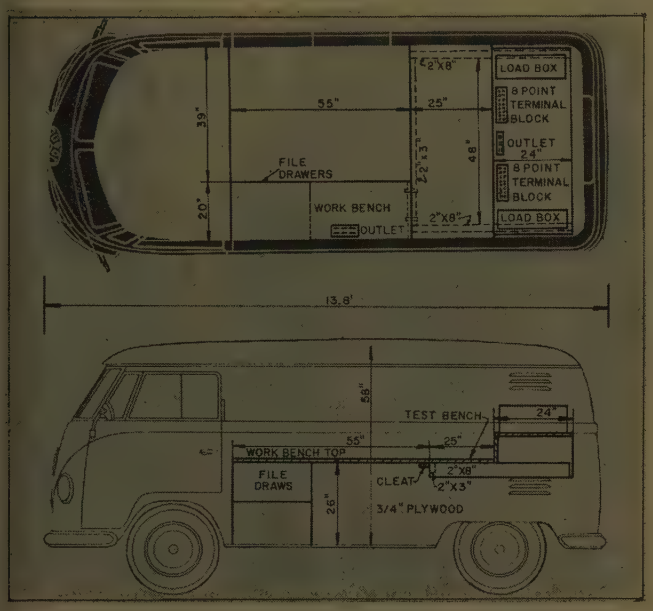
the bus. Once the station circuits have been opened, all that is necessary to test relays is to plug in the power and connect the test cables. The remote intercom station is also brought out so that the test engineer in the bus can communicate easily with the one manipulating the test jacks at the relays.

Using the Relay Test Bus

Most of the time-saving comes from having test equipment set up and ready to go at all times and from not having to tear it down and put it away for the trip to the next station each time. Further savings result from being able to work in inclement weather. The work bench, heat, and lights enable relay engineers to do intricate work on relays, test relays, make calibrations, and do record work in all kinds of weather and ground conditions.

The initial cost of the vehicle compares with that of standard passenger cars previously used and the operating cost is at least $100 less per year. Cost of outfitting the bus for relay testing was less than $300. This is for lights, heater, lumber for benches, file drawers, extra long cables, etc. All of the test equipment is the same as that formerly used for this purpose. All of the meters, instruments, load boxes, and other controls are held in place by wooden cleats and can be removed and used elsewhere when desired.

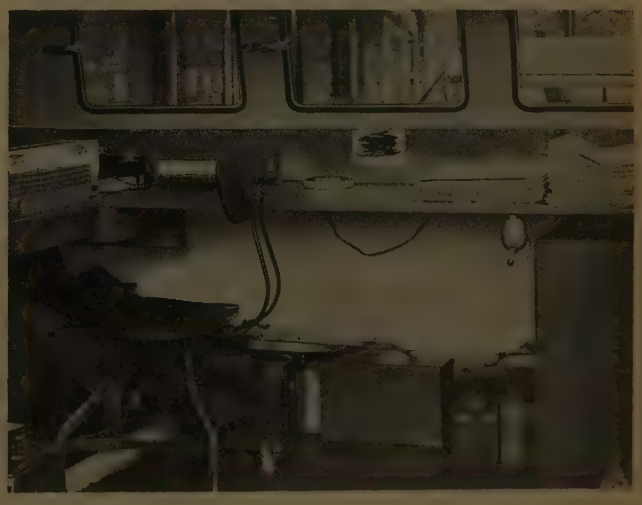
Because of the favorable experience to date, we are equipping another Micro-Bus for this service in our own section and one each in the Western and Southern Divisions. This vehicle is easier to handle and rides better than a panel truck or delivery van. Naturally, it does not handle or ride quite as well as a passenger car, but the convenience after it is on the job more than makes up for the difference.



Mobile test laboratory brings to any station the equipment needed for testing and calibrating relays. After the relay engineer arrives with the bus, it takes only 5 minutes to plug in the main power cable and connect the relay test leads. Formerly equipment had to be dragged from trunk of car and set up. Considerable time was wasted, and if the weather was bad enough, outdoor equipment could not be checked.

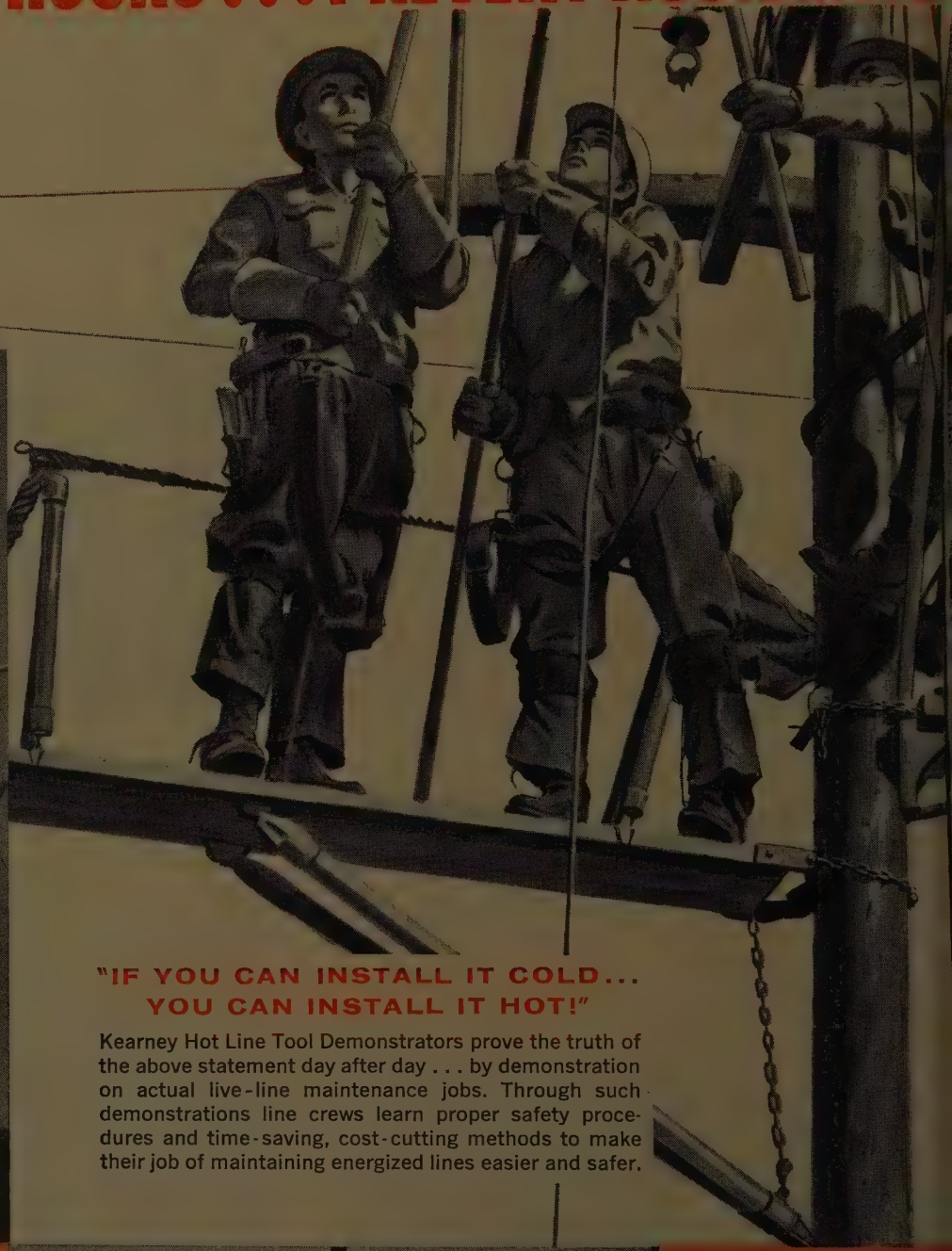
Test setup can be removed as a unit and used elsewhere if desired. Top panel of bench is easily lifted out by handles provided. Entire installation is flexible, and all benches and fittings can be removed and seats replaced to maintain resale value of vehicle.

Work bench also serves as desk, with files and storage area close at hand. This arrangement permits two men to work in the bus when relay repairs or adjustments are necessary. Incidentally, a 1500-w electric heater provides a comfortable temperature in the bus during cold weather, permitting intricate relay adjustments and other detail work.



Kearney Hot Line Tool Demonstrators
offer line crews new ideas and methods to...

SAVE MAN-HOURS . . . PREVENT ACCIDENTS



"IF YOU CAN INSTALL IT COLD... YOU CAN INSTALL IT HOT!"

Kearney Hot Line Tool Demonstrators prove the truth of the above statement day after day . . . by demonstration on actual live-line maintenance jobs. Through such demonstrations line crews learn proper safety procedures and time-saving, cost-cutting methods to make their job of maintaining energized lines easier and safer.

"On the job" demonstrations help solve spot problems and introduce new methods to line crews which can be used to advantage over and over again . . . to reduce costs, insure reliable operation and improve safety standards.

"We teach something, learn something . . . ev time out"... says C Brewer, Chief of Kear Demonstrators. This s up the attitude of Kear men in the field, expla why they are well-rega by line crews everywh

STOP NEEDLESS OUTAGES

Even experienced line crews can benefit from the specialized knowledge of Kearney Hot Line Tool Demonstrators. Their background and experience in all phases of rigging, hot line maintenance, and compression connector installation techniques fully qualifies them to assist in training line crews in improved methods to shorten installation time... prevent costly de-energizing of lines... and improve safety conditions.

Kearney Hot Line Tool Demonstrators... are your only single source of complete information on compression connector installation and hot-line maintenance techniques!

Kearney... and only Kearney... manufactures both a complete line of hot stick tools **and** a complete line of compression connectors, tools and dies. The completeness of these two lines is part of Kearney's planned program to provide power companies with a fully integrated selection of equipment to safely accomplish any phase of hot line work... without interruption of circuit continuity or service to customers.

If you would like to arrange for Kearney Demonstrator Service consult your Kearney Sales Representative. Adequate advance notice is necessary, of course, to permit proper planning and scheduling.

KEARNEY

JAMES R. KEARNEY CORPORATION

4224-42 Clayton Avenue • St. Louis 10, Missouri

PLANTS AT: ST. LOUIS • MELROSE PARK, ILLINOIS • FAYETTEVILLE, ARKANSAS
GUELPH, ONTARIO, CANADA • ST. THERESE, QUEBEC, CANADA

513

Hot stick schools conducted by Kearney Hot Line Tool Demonstrators keep linemen up to date on new installation and maintenance methods... new tools and equipment... new rigging techniques... and new ideas being used to advantage by line crews in other areas.

Chief Demonstrator Clete Brewer and his staff...

... cover the country. Kearney Demonstrators are available for help in training line crews or for consultation relating to specific job problems anywhere in the U. S. Each man is a well-qualified veteran with many years of past experience as a top lineman.

Chief Demonstrator Clete Brewer

Clete has a wide background of experience as a top lineman, hot line tool instructor and consultant on hot line maintenance. He has worked with, and helped train, line crews in virtually every part of the country. His experience is ideally suited to the demanding job of Chief Demonstrator.

CARL JONES

DICK TASKER

JIM MONARSKI

BOB DALE

BERT ROSE

"WHITEY" KOHLER

Appalachian Power's

"Project Decision" Helps Town's Bid to Industry

Area development specialists need not settle only for "conventional" efforts—work with chambers of commerce, development organizations, industrial companies—to attract and establish new business in communities the utility serves with electric power. One utility company, Appalachian Power Co., is proving that —with a project that is making communities all through its service area *improvement conscious.*

The company, which serves western Virginia and southern West Virginia, was impressed by the number of requests its Area Development Department received from manufacturers looking for available buildings in the area. In spite of the clear interest in buildings, Dorman M. Miller, man in charge of Appalachian's area development work, said that "many communities were poorly organized to undertake construction of buildings and were also reluctant to raise the money necessary for such a fairly large speculative investment."

To Appalachian, a major operating company of the American Electric Power System, it appeared to be an excellent opportunity to do something concrete to help the area, and so was conceived the utility's "Project Decision."

First step in implementing the project's objectives was to circulate a questionnaire to 73 communities in Appalachian's service area in Virginia and West Virginia—to find out how many cities and towns had sites of at least 10 acres, with a length-to-width ratio of approximately 1½ to 1. Was the land available? Was it zoned for industry? Was it served with rail siding, or was rail service feasible? What utility services were available and what capacity? These questions and similar ones established whether the community was a possibility for a new industry location.

From the responses to this questionnaire, Appalachian's Area Development Department found 35 communities that met these basic criteria and invited them to participate in Step Two, an exhaustive inquiry into all aspects of community and business life. (It should be noted that at no time was the exact nature of Project Decision revealed to anyone. The existence of the shell building that lay at the end of Project Decision was unknown; cities and towns were aware only that Appalachian was making a rather intensive survey dealing with industrial development.)

Step Two covered in detail 33 parts of community business, education, recreation and social life. The community ratings in Project Decision are not final. Participating cities and towns will be re-examined periodically to reflect improvements that could enhance their desirability as industrial plant locations.

Appalachian then proposed to Abingdon, Virginia, a community of 5,000, that it would invest $200,000 to erect a shell building there and that it would, through its Area Development Department, help to locate an industrial occupant that was both suitable for the building and acceptable to the community. This is not a handout arrangement. The community agrees to accept full fi-

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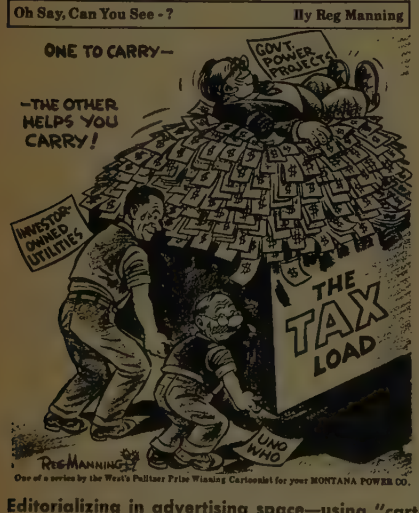
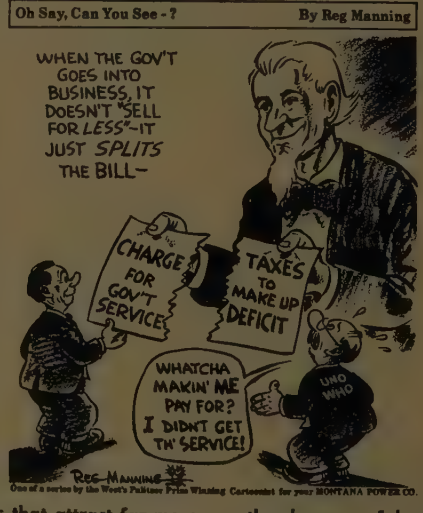




Editorializing in advertising space—using "cartoons that attract far more readers than the average advertisement"—the Montana Power Co. is getting a highly favorable reception from 58 daily and weekly newspaper audiences that periodically receive economic information from the utility in this most palatable form (above). Cartoons, by the Pulitzer prize-winning Reg Manning, tie-in with holidays, receive unusually good position in advertising columns. The utility's PR director, R. A. Neill, says the cartoons aim at four objectives: a comparison of our free enterprise system with other forms of government, an explanation of business terms, the dangers of large government and government encroachment upon business, and promulgation of the idea that what hurts or benefits business hurts or benefits the employee, the customer and the community. Comments Mr. Neill: "It is still far too early to judge how effective these ads are, and it will be a year at least before we attempt any survey. But, we feel the constant drip-drip of these cartoons should make a profound effect on the attitude of the public toward business . . . within the next two or three years." (Arrangements have been made to supply the cartoons to other utilities, for use in newspapers, house organs,

NUCLEAR NEWS

SENATE STUDY OF ENERGY RESOURCES, as proposed by its sponsors, would include an evaluation of the future role of nuclear energy; however, some political figures (like Sen. Clinton Anderson) have expressed doubts about the value of an intensive study of atomic energy as part of such a full-scale survey.

PRIVATE FUEL PROCESSING, under consideration for some time by representatives of the utility industry, might be deferred until industry has more incentive to build the required processing facilities. This would involve agreement by the AEC to permit storing of spent power-reactor fuels, rather than expanding Commission-owned processing facilities. (Meanwhile, utility representives have studied a proposal of the Davison Chemical Div. of W. R. Grace and Co. to construct a 1-ton-per-day plant for $22-million, using the aqueous Purex process. At 200 days a year, total operating costs including capital charges are figured at $21,000 a day; at 300 days the costs would be less than $18,000 per day.)

FUEL CELL COMBINATION which would use a nuclear reactor as the heat source has been under study for some time (and was reported by T. A. Ciarlariello and R. C. Werner in "Chem. Eng. Progress," Mar., 1961). Two general methods of integrating the fuel cell and nuclear reactor are: (a) external regeneration in which a pumped heat-transfer fluid conveys heat from reactor to regenerator and (b) internal regeneration in which the hydride disassociation process occurs within the reactor proper. It is estimated that the external system would have to operate some 100-F hotter than the internal system and would require about four times the flow rate.

CANADIAN A-POWER APPROACH, relying on the natural uranium, heavy-water reactor concept, has been endorsed by a special research committee of Canada's House of Commons. The CANDU program of Atomic Energy of Canada, Ltd., has been called the best chance for attaining nuclear power in the dominion . . . with the third CANDU plant expected to be directly competitive commercially with 5-mill power, according to AECL's Pres. J. L. Gray. The Canadian House committee also approved AECL's stated intention to construct no more nuclear power plants after CANDU.

ENTERPRISE IN CANADA in the nuclear field is getting little encouragement, meanwhile. AECL's vice-president for R & D, Dr. W. B. Lewis, revealed in an interview earlier this year that only two private industry suppliers—Canadian GE and AMF-Atomics—had been set up with government contracts. And, adjusting to decreasing demand, some Canadian uranium mines and mills have ceased operations or have combined with other mining companies.

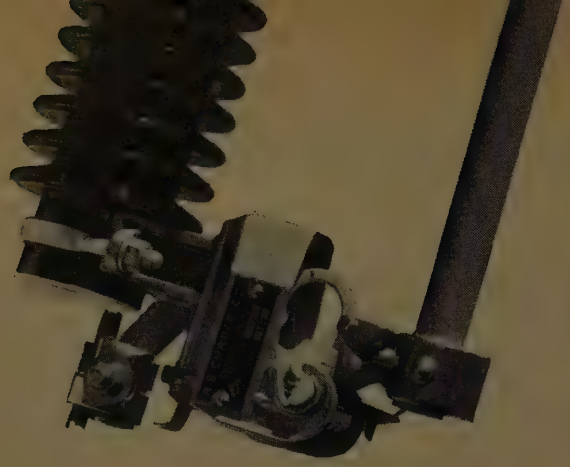
YOUTH CONFERENCE ON THE ATOM is again being planned for Chicago, Nov. 9-11, this time to run at the end of the week of the Atomic Industrial Forum and American Nuclear Society conferences. General chairman of the Youth Conference is Interstate Power Co.'s Pres. Milton L. Kapp. The Atom Fair exhibit is also scheduled for the same hotel (Conrad Hilton), from Nov. 6-9.

"PIONEERING WITH POWER," motion picture portraying the Yankee Atomic Elect. Co. project, was honored for "high industrial value" at the Second International Film Festival sponsored by the Rassegna Nucleare in Rome, Italy. Yankee Atomic Elect. Co., Stone & Webster and Westinghouse co-sponsored production of the 27-minute sound-and-color film.

IAEA TECHNICAL ASSISTANCE has been inadequate to meet the demand, the international agency's board of governors has been informed. Anticipating no letup in this demand, the IAEA indicates that it is emphasizing this basic criterion for the usefulness of projects proposed to it: that the country concerned considers the project worthwhile in the light of its own needs and resources in money and manpower. Says the IAEA: "The Agency's assistance can supplement a country's efforts; it cannot replace them. Experience shows that when this assistance is carefully used and well integrated with national programs, it can have important positive effects which far exceed the financial cost of the assistance."

RECENT CONTRACT AWARDS—*Babcock & Wilcox Co.* will extend its study of the "spectral-shift" control reactor (heavy-light water moderated) under a $211,000 contract with the AEC; *Blaw-Knox Co.* will provide architect-engineer services in the design of a uranium-thorium fuel reprocessing plant to be built in southern Italy by *Allis-Chalmers* for the national committee for nuclear energy (CNEN); *Allis-Chalmers* will build a $341,000 reactor vessel for the High Flux Isotope Reactor planned for operation at ORNL by 1964 (to provide transuranium elements for research); *General Electric* is supplying nuclear instrumentation for AEC reactors at Oak Ridge (the Experimental Gas-Cooled Reactor) and Hanford (the New Production Reactor); and control rod assemblies for the NPR are to be furnished by *Smith Dynamics*, division of Smith Industries International, Inc.

PUBLICATIONS TO REVIEW: From *General Electric:* "General Electric Nuclear Fuel" (GEA-6762B); From *Monitor Systems, Inc.* (Ft. Washington, Pa.) —"Nuclear Data System Bulletin"; from *ASTM*— "Materials in Nuclear Applications STP 276" ($8.25, members, $6.25); from the *Atomic Industrial Forum* —"Nuclear Frontiers—1960" ($10.00 a copy).



Here's how the F2 interrupts LOW FAULT CURRENTS

Most faults are down in the low and middle range . . . and here's where 100% dependability is really important. These excerpts from typical tests show how the F2 performs in the low range.

FAULT CURRENT* INTERRUPTED	VOLTAGE	POWER FACTOR
115	15 KV	10%
200	14.4 KV	50%
400	14.4 KV	40%
600	14.4 KV	30%
800	14.4 KV	24%

*Amperes RMS Asymmetrical

The FACTS are...You need more than High Interruption Capac

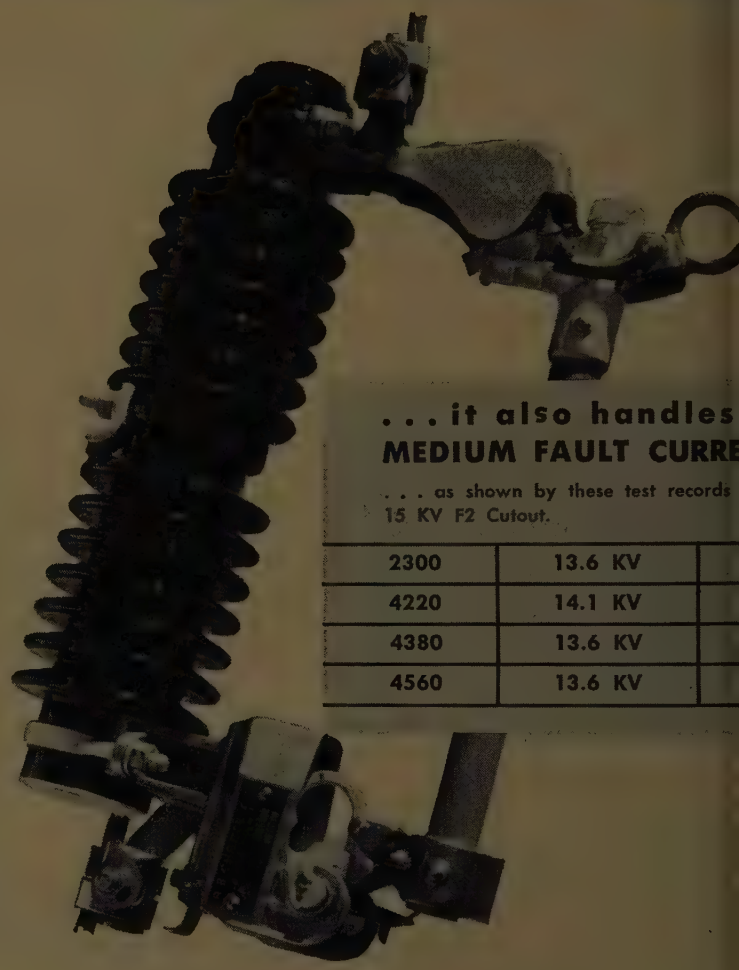
The CHANCE F2 CUTOUT Protects your system from ANY fault current...up to its maximum rating

What you really need in a cutout is overall protection . . . not just high interruption capacity, but positive performance at *all* fault currents, be they low, high, or "in-between."

The Chance F2 Cutout (already accepted and proved in service by 50% of the major utility systems in the country) gives this overall protection throughout its full rating. Gives it because: a fuse link ejector and small bore fuse tube make doubly sure that the cutout operates on low fault currents; its expendable cap, positive contact engagement, and positive latch make certain that it operates on high faults *without damage.*

The F2 Cutout is available from local stocks in voltages of 5.2, 7.8, 15 and 27 KV, and in 100 or 200 amp. ratings with interruption capacities as high as 12,000 amps. You can get the whole F2 story from your Chance salesman, or write us.

A. B. CHANCE CO.
CENTRALIA, MISSOURI
(A. B. Chance Company of Canada, Ltd., Toronto)



. . . it also handles MEDIUM FAULT CURRE

. . . as shown by these test records 15 KV F2 Cutout.

2300	13.6 KV	
4220	14.1 KV	
4380	13.6 KV	
4560	13.6 KV	

and when HIGH FAULT CURRENTS do occur, the F2 clears them without damage.

These test excerpts show what you can expect from a 15 KV F2 Cutout in the high fault range.

8400	13.6 KV	7%
8630	14.1 KV	13%

WASHINGTON OUTLOOK

BY RALPH ELLIOTT
WASHINGTON EDITOR

Mr. Kennedy Pokes A Hornet's Nest

Two immediate results of President Kennedy's speech outlining his program for building up the Nation's military preparedness were vitally significant. One was the unified demonstration by Congress of a readiness to back up the Commander-in-Chief with every dollar actually needed for defense purposes. The other, equally important, was that the Kennedy approach to preparedness has floodlighted the extreme fiscal irresponsibility of the New Frontier, and could well generate enough opposition to force curtailing Administration spending programs in non-essential areas.

With the public debt spiraling toward the $290-billion mark, and with a fiscal 1962 deficit of $4.9-billion projected by the Joint Committee on Internal Revenue Taxation—even without reflecting the additional defense spending—Mr. Kennedy and his advisors could not have been unaware of the inflationary danger of spending nearly $3.5-billion for more arms without any curbing of non-defense outlays to offset the huge increases. The President's words were revealing of such an awareness, for he spoke of higher taxes if necessary and of demanding, if need be, "more control or other new powers." This could only mean wage, price and other controls that went into the economic regimentation prescription concocted by the New Deal as the cure for the inflation sickness.

In refusing to knuckle down to fiscal discipline by way of giving ground on welfare and other political spending, Mr. Kennedy has chosen the risky road toward a further weakening of our economy at a time when it should be strengthened for the long-pull struggle with Communism. It is also a course, the President tells us, calling for substantial sacrifice by the people. Yet it calls for no sacrifice, or even mild retrenchment, on the part of the Administration.

Judging by the avalanche of criticism from Capitol Hill—by Democrats as well as Republicans—the President miscalculated the impact of his choice. The "all this and defense too" program has worked to solidify Republican-conservative Democrat opposition to reckless spending and deficit financing. It can be expected that non-essential budget items will now be screened far more carefully and critically than would have been the case before the Kennedy supplemental defense program was unveiled.

Indicative of the unusually touchy atmosphere created by the President's approach was the unprecedented action by the entire Republican membership of the House Ways and Means Committee, which must pass on all appropriation bills. In a lengthy and scorching letter to Mr. Kennedy, these ten members stated: "The shocking fact of the fiscal implication of your new defense proposals is not so much found in your failure to point the way to tax revenues to finance the new defense costs, but instead is largely found in your apparent unwillingness to make any downward revision in pending proposals for optional non-defense spending so as to minimize the tax burden bequeathed to tomorrow."

The Republican Congressional Committee insisted that the Nation "cannot afford the fat of social experimentation at this time if we are to develop the sinews of survival."

Several Southern Democrats of the conservative camp have been outspoken in their critcism of the President's refusal to trim non-defense spending to ease the burden of preparedness costs. Many more have been privately critical.

Undoubtedly enough money for the new defense build-up could readily be squeezed out of foreign aid and the various welfare and subsidy programs of the Administration with no great harm done. And certainly such an economy-strengthening, common sense approach would give a much needed boost to the taxpayers' morale. Whether Congress will have the courage to pursue this course will have become fairly evident by the time this is published.

Those who support the President's approach have challenged his critics with questions as to just where, and to what extent the Administration's spending programs could be trimmed. The specific answers must, of course, come from Congress as it takes up each program individually and in detail.

But in at least two areas the answers are obvious without the aid of fiscal experts. They concern the Administration's proposal to spend $95-million to build an outmoded, uneconomical type of electric generating station at the government's Hanford atomic energy plant, and $134-million for an all-federal transmission grid for the Colorado Storage Project. The needless Hanford plant would, by the antiquated process of utilizing low-pressure, saturated steam, produce high-cost power and would doubtless require continuing federal subsidies. But to the Administration it has a high political value: it would establish a federal steam plant precedent outside the TVA area.

The Administration insists on going forward with the all-federal Colorado project grid, despite an offer by five electric companies to do a better job at no greater cost to the power users. The New Frontier planners, however, see this network as a key link in the hoped-for giant federal grid. Here the Administration would not only spend a large sum unnecessarily, but at the same time would be drying up a substantial source of tax revenue.

And curiously enough in the case of both these power projects, the end result would be a furtherance of state Socialism, a first cousin to the very thing we're supposed to be fighting—Communism.

Tax Incentives for Modernization and Expansion

The following statement by Alexander L. Stott, Comptroller of the American Telephone & Telegraph Company before the Committee on Ways and Means of the House of Representatives, is of great interest to the private electric utility industry.

It should be noted that the Administration's tax relief proposals consist essentially of applying an amount based on a percentage of capital expenditure in a particular year against the taxes paid to the Federal Government in that year. In other words, the faster the growth, the greater is the amount of relief which a company will get. It is obvious therefore that there would be substantial tax discrimination between companies having different rates of annual capital expenditures.

The General Statement

Mr. Stott noted in part that " . . . it is my opinion that if the proposal were superimposed on our present tax structure, it would provide only a limited stimulus to growth and would not have a significant impact on industry generally. The proposal would operate unevenly as between the different segments of the economy. Moreover, businesses which are already in a strong competitive position or are now growing rapidly might receive tax windfalls, with construction programs little influenced by the incentive provisions."

Mr. Stott noted further that such measures would not solve the crucial problem of modernizing the Nation's industrial plant, and that only price level depreciation based on dollars of current purchasing power can successfully achieve this objective. Mr. Stott noted in part that: "Modernization of the Nation's productive capacity must be speeded up so as to improve our competitive position in world markets, to help balance our international payments and to create job opportunities for our growing work force. I believe that no time should be lost in establishing the sound depreciation practices so necessary to this result."

He continued: "I suggest price level depreciation as a remedy, under which depreciation allowances would be adjusted to reflect changes in the purchasing power of the dollar."

Mr. Stott noted that while depreciation based on original cost was valid when the purchasing power of the dollar was stable and tax rates were relatively low under today's inflationary conditions and high tax rates, the end result was the confiscation of property. Mr. Stott told the Committee: "The assumption that the dollar was a stable measuring unit has long since been proven false. Since 1940 this country has experienced an inflation which has cut the dollar's purchasing power by more than half. During this period tax rates have risen to high levels. With depreciation allowances falling far short of the original purchasing power of the dollars consumed in production and with high tax rates, capital has been eaten away. As a result not only have funds needed for modernization of plant been restricted but new investment in existing industries and in new enterprises has also been discouraged."

He noted further that: "Even if further inflation could be prevented the problem would not be solved. Erosion of capital would nevertheless continue because a substantial amount of plant remaining in use was constructed during periods when the dollar had a far greater purchasing power than at present."

Essential Depreciation Principles

The following important observations were made by Mr. Stott:

" . . . so long as depreciation allowances are less than true depreciation—that is, less than what is actually happening to the plant involved—taxable income is, in reality, overstated, taxes paid are too high and the result is a tax on capital. Depreciation allowances must be equivalent to the purchasing power of the original investment in the assets being consumed in production or the capital invested in the business will be taxed away in the guise of income."

"On the other hand, when depreciation allowances are more than true depreciation—that is, more than what is actually happening to the plant involved—taxable income is, in reality, understated, taxes paid are too low and the tax burden is shifted to others. This can happen where a taxpayer uses depreciation methods which, although proper for the plant of another business, are more liberal than can be justified by the actual depreciation of the taxpayer's plant."

Recommendations to House Committee

Mr. Stott's principal recommendation was "that taxpayers should be allowed depreciation based upon the original cost of their property with the dollar amounts allowed being adjusted, however, to reflect changes in the purchasing power of the dollar. For the purpose of making these adjustments, (he recommends) the use of a general purchasing power index such as the Consumer Price Index. The Treasury Department could prescribe such an index for general application."

Another eminently sound recommendation which Mr. Stott made to the House Committee on Ways and Means was to the effect that

"Any new tax legislation should contain a provision that a taxpayer cannot use more liberal depreciation methods for tax purposes than are used on the taxpayer's books of ac

(Continued on page 62)

ECONOMIC OUTLOOK

BY A. C. FARMER
ECONOMIC CONSULTANT

Current Growth in the American Economy

In 1961 the recovery from the 1960 recession has been extremely slow—particularly in comparison with the recovery in 1955 from the 1954 setback and the recovery in 1958 from the 1957 setback. It is desirable, therefore, once more to review the circumstances that are preventing a more rapid recovery in 1961.

The Federal Reserve Discount Rate sets a floor for interest rates and for this reason the three (3) percent discount rate of the Federal Reserve Bank for many months has proved to be a barrier to rapid economic recovery. This is noted on the chart.

The following facts also can be noted by reference to the chart:

(1) The economy staged a rapid recovery in the period 1954 to 1958. This recovery was initiated by the fact that in 1954 the Federal Reserve Discount Rate had been reduced to one and one-half (1½) percent.

(2) This low interest rate on borrowings by commercial banks from the Federal Reserve Bank immediately stimulated an expansion of loans by the commercial banks.

(3) A parallel increase in the Federal Reserve Discount Rate from one and one-half (1½) percent in 1954 to three and one-half (3½) percent in 1957 finally slowed down the expansion of commercial bank loans, and this brought on the recession of 1957-58.

(4) Economic recovery immediately was stimulated in 1958 when the Federal Reserve Discount Rate was reduced to one and three-quarter (1¾) percent—(April 1958).

(5) Commercial bank loans again immediately were stimulated, supplying the additional money for the stimulation of business activity.

(6) The economic recovery once more receded from its peak when the Federal Reserve Discount Rate was increased to four (4) percent.

Certain related facts now should be noted—

(1) In the previous period of economic recovery, the step-by-step increases in the Federal Reserve Discount Rate—from one and one-half (1½) percent to three and one-half (3½) percent were fairly deliberate—covering in all a period of about three years.

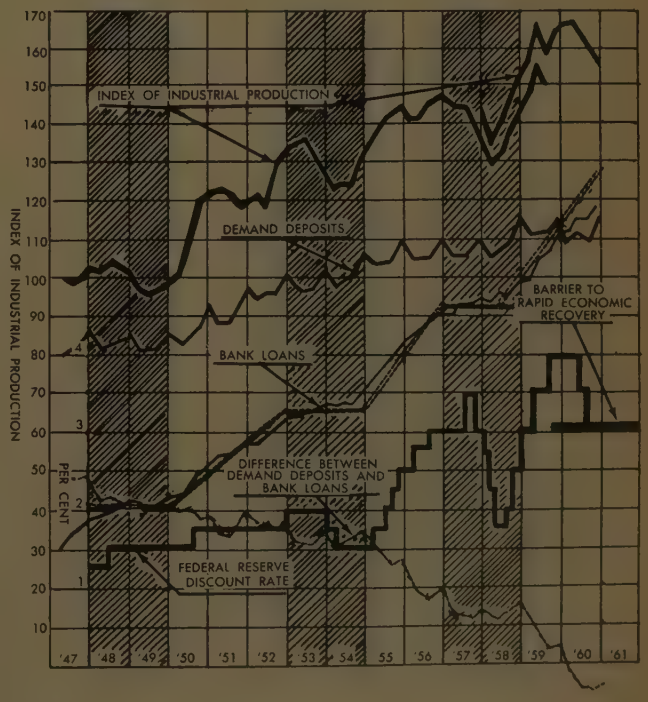
(2) In the next period of economic recovery the step-by-step increases in the Federal Reserve Discount Rate from one and three-quarter (1¾) percent to four (4) percent were quite rapid, covering in all a period of only one (1) year, and the recovery period consequently lasted only one (1) year before topping out and then receding. Why the unseemly haste from 1958 to 1959? Probably to reduce the depletion of the gold stock, which undoubtedly was the reason also why the Federal Reserve Bank in 1960 did not reduce the discount rate below three (3) percent.

(3) Regardless of the reason, the failure to reduce the discount rate below three (3) percent seriously has affected the economic recovery in 1961, since the stimulus to expanding loans provided by a low rate of interest has been lacking. If in 1960 the discount rate could have been reduced to around two (2) percent, the economic picture today would be entirely different.

(4) With a Federal Reserve Discount Rate of three (3) percent a slow recovery is taking place, and if this rate of three (3) percent should be maintained, this slow rate of economic recovery would be maintained although unemployment would not particularly be reduced. But now another factor has appeared. Interest rates on borrowed money have begun to move up, and if this should be continued, the economic recovery now being experienced will grind to a halt.

Otherwise, with the Federal Reserve Discount Rate maintained at three (3) percent, the economy will continue its present slow rate of recovery with a seasonal upturn in the last months of the year.

Editor's Note: With this discussion of business economics, Mr. Farmer begins his eighth year of regular contributions to the editorial pages of EL&P. He confides candidly: "Unfortunately, the economic situation gets foggier all the time. Today, we have the deliberate support of policies known to be wrong—the overriding problem being this disregard of economic laws, plus just plain ignorance." He sums up a dilemma this way: "The present situation is not satisfactory. Business is dragging and will not get better soon."



NEW PRODUCT DESIGN

General Service Body

The new Highway model HSB "all-purpose" general service utility

body, by **Utility Division, Highway Trailer Industries, Inc.,** is designed for multi-use such as municipal and utility, airline service, contractor and other "service"-type businesses. The HSB90 body dimensions are 90 in. long, 77½ in. wide, 42 in. over-all height, 29 in. from floor to top. The floor is made from 14-gauge tread plate steel anchored to four formed cross-bearers of ten-gauge steel. The general purpose body is equipped with a hinged tail gate with chain and hooks for positioning and locking. Sliding-type roof and ladder racks are optional.

Circle item #1 on reply card

Unitized Metering Switchboard

A newly designed, free-standing metering switchboard, which, the

company says, accommodates nearly twice as many meters in half the space required for comparable quantity of wall-mounted units, and also reduces installation cost and time, is now being marketed nationally by **I-T-E Circuit Breaker Company's Walker Division.** Each section of the compact, new I-T-E Uni-Power metering switchboard, says the company, is a self-contained, free-standing unit on which meters may be mounted front and back. Each section measures 32 in. wide, 13½ in. deep and 77½ in. high.

Circle item #2 on reply card

New Suspension Insulator

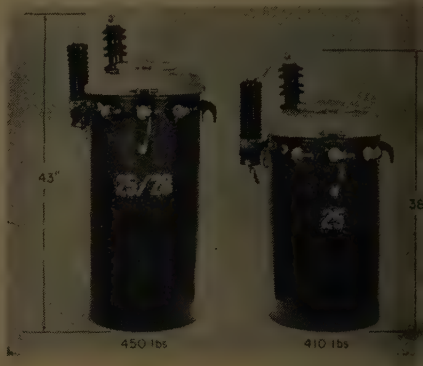
A new "compact" nine-in. suspension insulator with, the com-

pany says, combined M&E strength rating of 14,000 pounds is announced by **Lapp Insulator Co., Inc.** The new suspension, called "Hi-F" (high-efficiency) combines the cap-head-and-pin design of a standard six-in. dead-end insulator, says the company, with the shell design of a standard 10-in. suspension. Since both the cap and the shell are one-inch smaller in diameter, the companys says the new "Hi-F" suspension has the same leakage distance as the standard 10-in. insulator. Unit spacing is the same so string flashover characteristics of the new "Hi-F" suspension, e.g., wet, dry and impulse, are the same as existing NEMA standards for 15,000 lb. 10-in. suspensions, according to the company.

Circle item #3 on reply card

New Distribution Transformers

A new line of Permalex® 65 dis tribution transformers which, a



cording to the company, will reduc the total owning cost of transform ers for the nation's electric utilitie has been announced by **Genera Electric's Distribution Transforme Department.** Presently in produc tion in ratings of 167-kva and be low, the new 65 C transformer de signs are up to 15 percent lighte and 12 percent smaller, the com pany says, and have lower losse than conventional 55 C units. Th new 65 C transformer design wi be offered at a purchase price up t 10 percent lower than previous 5 C designs, the company says.

Circle item #4 on reply card

Three-Conductor Bundle Block

Sherman and Reilly has recentl developed a bundle conductor bloc

for stringing three conductors s multaneously with a single pulli line. The S&R articulated wedg

shaped running board, with swivels at points of connection of conductors and pulling line, insures smooth operation, the company says. The aluminum sheaves and center drum are mounted on ball bearings with all grooves having full, vulcanized-in-place Neoprene lining. Frame is galvanized steel with parallel crossbar, pin-connected on both sides, and fitted with socket connector for direct connection to insulator string.

Circle item #5 on reply card

Corona Free Connector

To meet increasing high voltage requirements in substations, **Anderson Electric Corporation** has introduced a new line of corona free connectors and bus supports. Sharp radii, exposed hardware—and other sources of corona loss and radio interference—are eliminated, the company says, in the design which provides smooth flowing radii and large surface area. Bolts, nuts and threads are recessed and the finish is free of imperfections, marking letters, and other protrusions, according to the company. Tests performed show that this new type connector and bus support can be operated corona free on 345-kv systems with less than 50 microvolts radio interference voltage, says the company.

Circle item #6 on reply card

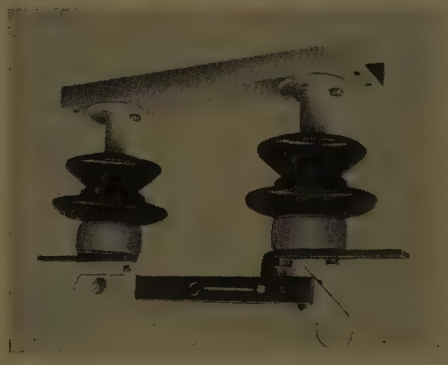
20,000-Ampere Enclosed Cutout

An extended line of enclosed fuse cutouts with fault interrupting ratings up to 20,000 amp, the company says, is available from **Westinghouse Electric Corporation.** Increased rating of the new cutout (type EUH) is achieved through use of a glass-fiber fuse tube that replaces the standard paper fuse tube in lower ratings, according to the company. The higher-rated enclosed cutout is still recommended for all systems 13.8-kv three-phase grounded wye, down to 2400-volt delta, says the company.

Circle item #7 on reply card

New Air Switch

Solid-silver contacts, the company says, ensure longer life and added reliability in a new line of Hook-Operated air switches introduced by **Federal Pacific Electric Co.** Available in ratings of 7.5 kv through 34.5 kv, and 400, 600 and 1200 amp, the AgH air switches are, says the company, the first of a new competitive line which incorporates several unique design features developed at Federal Pacific's high voltage laboratories. The new AgH switches have momentary ratings of 20,000 and 40,000 amp, the company says, and are manufactured in accordance with latest NEMA, ASA and AIEE standards. Two types are available: Single-Pole-Single-Throw, and Single-Pole-Tandem-Transfer.



Circle item #8 on reply card

New Data Transmission System Allows Communication Over Voice Channels

A new digital data transmission system has been developed by Hallicrafters to allow data acquisition and processing systems to communicate over low-cost, universally available commercial quality voice communication channels, the company says. High-speed transmission of digital data is possible with maximum reliability—without the need for many costly equalization networks, says the company.

Known as Hallicrafters CTDS 2400—consisting basically of a transmitter and a receiver—the system converts binary pulses to an audio frequency signal which can be transmitted and demodulated in the receiver to yield the original signal with a maximum error possibility, it is said, of only one bit in a hundred thousand.

Sky hooks—no longer imaginary items in this age of 'copter construction—swing an aluminum crossarm assembly into place atop an electrical transmission structure, near Wenatchee, Wash. Designed and fabricated by Aluminum Company of America's Alcoa Structural Division, the "sky hooks," aided by a six man line crew, "framed" 103 towers in three days, the company says. Carried distances up to five miles, the crossarm assemblies were mounted on poles 70 to 90 feet high.

New IBM 'SURE' Program Reduces Computer Installation Costs

SURE (for Symbolic Utilities Revenue Environment) is a computer program, developed by International Business Machines Corp. that is easily tailored by individual companies to meet billing requirements. Utilities using SURE, the company says, wil be able to realize the benefits of data processing more rapidly than in the past, and recover installa tion costs quicker by reducing the time required fo programming.

G.E. Develops Super-Sensitive Air-Pollution Detector

General Electric Company has developed a devic which promises important help in the battle agains air pollution. The device, called "condensation nucle detector," is so sensitive for detecting tiny airborn particles, the company says, that it could find single speck lost among 1,000 trillion other specks This would be like spotting a solitary grain of whit sand on a beach full of yellow grains.

An unusual application of the device—not yet com mercially available—is predicting the useful life o certain electrical equipment on the basis of a singl operation. The life of contact points in an electrica relay could be accurately predicted with the point coming together just once. Similarly, the safe tem perature range for electrical insulation can be deter mined quickly and accurately, without destroyin the material under test. The insulation is heated t the point at which it begins to give off invisible nu clei. This occurs well before the insulation start breaking down.

Westinghouse Offers Stainless Steel With Improved Weldability

A new type of stainless steel—Kromarc 55—wit improved weldability—is available from the Westing house Electric Corp. The strength and corrosion re sistance of the new alloy are expected to be equiva lent to that of any AISI type 300 series stainless steel of similar alloy content, the company says.

Kromarc 55 alloy can be used in the manufactur of parts for elevated temperature service, accordin to the company. It is particularly applicable, the com pany says, for use in steam turbines where large sec tions and large-diameter thin-walled pipe are welde together. In these applications, Kromarc 55 alloy ca be used in the weld rod as well as in the cast rolled sections being joined, and is suitable for join ing other austenitic stainless steels such as AISI typ 316. This material can also be applied, it is sai where weldability and strength at temperatures u to 1200 degrees F are required and where large se tions must be welded such as in petroleum an chemical processing equipment.

Packaged Solids-Processor Installed at Westinghouse

Two separate manufacturing operations at Westinghouse Electric Corporation's lamp facilities in Bloomfield, N. J., have been replaced by a ten-cubic-foot solids-processor which contains a liquid solids blending and vacuum drying process within one completely packaged and instrumented unit.

Basically, the solids-processor, manufactured by the Patterson-Kelley Co., Inc., is a pre-packaged, V-shaped jacketed shell containing an internal liquid dispersion device, an agitator and a vapor take-off with filter.

Nooter Corp. Plans $1-Million Expansion Program

A $1-million expansion program will gear the Nooter Corp. to the growing needs of the nuclear age and boost its employment by ten percent or more, it was announced by the company.

The 65-year-old St. Louis company is one of the leading fabricators and erectors of tanks and pressure vessels for a wide range of processing industries, both in this nation and abroad. The increase in present shop area and heavy duty equipment will enable Nooter to produce vessels weighing up to 250 tons, or twice as heavy as their present capacity.

Emerson Electric To Build Living Effects Laboratory

Construction has been started for a full-scale Living Effects "laboratory" for Emerson Electric Manufacturing Company on the grounds of their headquarters in St. Louis County. When completed the building will be used for testing and development work in residential electric heating, cooling, ventilating and lighting products manufactured by the company's Builder Products Group; and commercial lighting fixtures manufactured by Day-Brite Lighting Co.

Federal Pacific Opens New Midwest Operations Center

Federal Pacific Electric Company has opened an ultra-modern manufacturing, warehousing and sales center in Des Plaines, Ill. The 185,000 sq ft plant, on the Northwest Expressway near O'Hare International Airport, will house FPE's Economy Fuse Division, the Economy Screw Corp., regional sales offices, and its midwestern redistribution warehouse, as well as its Cornell-Dubilier Electronics Division's regional sales office.

New Data Processing Center

Minneapolis-Honeywell's Electronic Data Processing division has opened a new Computer Service bureau at division headquarters in Wellesley, Mass. The Wellesley service bureau, equipped with Honeywell 800 EDP system, is located in the firm's Marketing and Education center. Other equipment at the Wellesley bureau includes electronic converters that automatically translate records on magnetic tape from IBM and Univac language to Honeywell language. The bureau also will be equipped with a Honeywell 400 system early next year, Walter W. Finke, division president announced.

Finke said that other service bureaus will be established elsewhere in the U. S., and perhaps overseas, at a later date. The immediate objective of the new bureau is to provide Honeywell EDP customers with strategically-located facilities for pre-delivery checkout of their computer programs, personnel training and data processing time for emergency use.

Standard Transformer Adds Manufacturing Space at Warren

Standard Transformer Company, a division of American Gage and Machine Company, has announced the acquisition of an additional 78,000 sq ft of manufacturing space on a three-acre site adjoining its Warren, Ohio plant. The buildings and land were formerly owned by the Packard Electric Division of General Motors.

Tempo Moves To New Plant

Tempo Instrument Inc. is moving all operations into a new plant at the Technical Industrial Park on the extension of the Bethpage State Parkway, adjacent to Old Country

This heavy-duty Kling Bros. angle shear, recently installed by Kaufman Enterprises, Inc. at Kaufman, Texas, has a 390-ton capacity and is designed to shear metal angles up to 8 x 8 x ¾ inches. This is one of several recent equipment additions at the plant.

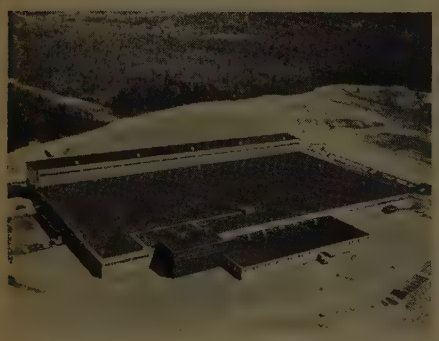
Road in Plainview, L. I., N. Y. The new facility will give Tempo twice as much space as it now has in its present location at two plants in Hicksville. The plant will serve as central location for all engineering, production, quality control and administrative activities of Tempo's three operating divisions.

Kaiser Installs New Vulcanizer For Insulating Conductors

Extensive new equipment at Kaiser Aluminum & Chemical Corporation's plant in Bristol, R. I., provides the company with one of the world's most modern facilities for insulating copper and aluminum electrical conductors.

Known as a vertical continuous vulcanizer, the line of equipment is housed in a 126-ft aluminum-clad tower located near the center of the Bristol works. It represents the tallest and largest vertical "CV" machine in existence, the company says.

Porter Co. Opens Lynchburg Plant



A new plant at Lynchburg, Va. for the production of distribution transformers, lightning arresters and industrial crane conductor systems has been put into operation by Delta-Star Electric Division, H. K. Porter Company, Inc. The new plant will serve electric utilities and a wide range of industrial customers.

The new plant, 250,000 sq ft in area, is equipped with a high voltage and high current surge laboratory capable of performing all standard tests, the company says. Lightning arresters can also be tested to destruction.

MEN OF POWER

The board of directors of General Electric has announced the election of **Gerald L. Phillippe** as president of the company. He had

Phillippe LaPierre

been comptroller and principal financial officer since 1953. **Cramer W. LaPierre,** formerly vice president and group executive in charge of the company's electronic and flight systems group, was elected executive vice president.

Mr. Phillippe was named traveling auditor for G.E. in 1935, and later became statistician. He was appointed auditor of an operating division in 1947, later named division comptroller, and most recently elected comptroller and principal financial officer serving also as general manager of the accounting services division.

Mr. LaPierre was elected a vice president of the company in 1952, and later appointed a group executive.

* * *

W. E. Kerr, president of Pennsylvania Transformer Division of McGraw-Edison Company since 1952, has accepted the chairmanship of the company's Pennsylvania-Lectro Management Group. **Fred H. Plank,** formerly president of Lectromelt Furnace Division, has been named to succeed Mr. Kerr as president of Pennsylvania Transformer. Other top personnel changes at Pennsylvania Transformer are: **W. R. Swoish,** vice president and sales manager since 1949, to vice president of marketing; **Walter W. Renberg,** now assistant sales manager, to sales manager.

John Q. Dickerson, formerly a sales representative with A. B Chance Company, has been appointed a field engineer by Anderson Electric Corporation. He will work closely with Anderson's field sales force.

* * *

Albert Bauer, general manager of system operations for Pacific Power & Light Company, and **Veryl N. Hoover,** manager of the Wyoming division, have become vice presidents of the utility effective with the recent merger of California Oregon Power Company into Pacific Power. Mr. Bauer is a past president and director of the Portland Chamber of Commerce and served for several years on the chamber's industries committee. Mr. Hoover was an Oregon resident prior to his assignment to his Wyoming post in 1956. He was an executive with Mountain States Power Company when it was merged with Pacific Power in 1954.

* * *

Philadelphia Electric Company has announced the appointment of **Edward S. Halfmann** as assistant director of research in the utility's engineering and research department. He began with the Company in 1937, and was serving as engineer in charge of the electrical research section until his recent appointment.

* * *

Wayne A. Johnston, Illinois Central Railroad president, has been elected to the board of the Allis-Chalmers Mfg. Co. He replaces **James D. Cunningham** who is retiring.

* * *

Albert B. Cook, a 36-year veteran of Pacific Gas & Electric Company, has been appointed the company's commercial manager succeeding **R. W. Joyce** who recently became vice president in charge of commercial operations.

* * *

Oliver W. Durrant has bee

named manager of a newly created automation and control section in the engineering department of the Babcock & Wilcox Company's Boiler division. He will be responsible for developing the proper application of controls and automatic operating equipment to the company's steam generators and associated equipment.

* * *

H. L. Murphey, Jr., formerly special assistant to the chairman of the board and president, has been appointed manager of Duquesne Light's newly established Public Affairs Department. **John P. Schmidt,** formerly superintendent of operations, Downtown District, has been appointed director of the new department.

* * *

Former Resident Manager of the Karadj Dam project in Iran, **Robert E. Brown** has been named by Seattle City Light to be project manager for their Boundary hydroelectric plant to be built in northeast Washington.

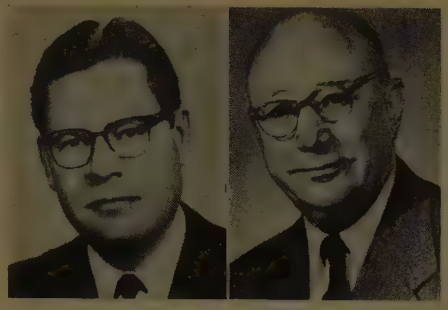
* * *

Ed. F. Dissmeyer, a vice president of Ohio Edison Company, has been elected a director of the utility. He has been associated with the company and predecessor affiliated companies for more than 35 years. Named Ohio Edison's chief engineer in 1952, he was delegated later to handle special engineering and operating assignments, reporting to the president, and most recently, was placed in charge of production, transmission, engineering and construction for the Company.

* * *

Walter J. Matthews, operating manager of the Virginia Electric and Power Company, has announced his resignation to accept the position of executive vice president of the Public Service Company of Indiana. He will assume his new duties in October. Mr. Matthews joined Vepco in 1936 and since that time has served in various positions including superintendent at Fredericksburg; district superintendent at Clifton Forge; district manager at South Boston, and general sales manager at Richmond. He was appointed Operating Manager in 1958.

The James R. Kearney Corporation and Hubbard and Company



Morrell Wenner

have announced jointly the election of **Charles P. Wenner** as Chairman of the Board of Directors of both companies. Mr. Wenner is president of Kearney and a director of Hubbard. He will replace **Franklin H. Kissner,** former chairman of both companies, who has resigned, but will remain a director of both companies. **John R. Morrill,** continuing as president of Hubbard & Company, has been elected president of James R. Kearney Corporation. He was general manager of the Evansville, Indiana operation of Bendix-Westinghouse Automotive Air Brake Company prior to joining Hubbard in 1959.

Men of Power Briefs

C. J. Weber has been named assistant manager, and **A. C. Chiazza** sales manager of the Westinghouse aerospace electrical department.

Appointment of **H. W. Cory** to the new post of assistant general manager has been announced by Allis-Chalmers Norwood (Ohio).

New agricultural engineer for Carolina Power & Light Company is **Justus M. Ammons.** He will work with agricultural agencies and organizations and with individual farmers in the promotion of farm electrification as a means of boosting farm income.

D. J. (Dave) Anderson, formerly assistant to the corporation's sales manager, has been appointed Saskatchewan Power Corporation's Public Relations Superintendent.

Two executive changes are announced by Leeds & Northrup Co.: **Alexander H. Reynolds, Jr.,** presently treasurer, to vice president; **Stephen Loidl, Jr.,** presently controller, to treasurer and controller.

Area Development — *from p. 36*

nancial responsibility when the tenant is found. When this is done, the next part of Project Decision develops—Appalachian's investment is returned to it, and will promptly be put into another building in another community.

Project Decision is thus a continuing program. Appalachian believes it is the only investor-owned utility to embark on such a program, which will accomplish, it is hoped, two things. First, it supplies the initial impetus and cash necessary to put up a building to attract industry, and assumes all the risk of this investment until an occupant is found; and second—and Appalachian officials regard this as equally import—it offers tangible rewards to those communities who deliberately set out to improve themselves.

The Company believes the significance of Project Decision is not that Appalachian Power Company is investing money to erect a shell building, although that certainly has real meaning to the area the company serves. Nor is the fact that Project Decision is a continuing program . . . that Appalachian will go to a second community, and a third, and so on, repeating the proposal, putting up new buildings, and attracting new industries and new payrolls.

Appalachian officials believe that the real value of Project Decision lies in the fact that it has made communities all through its service area improvement-conscious. Area Development Department representatives, by bringing to a community its "profile" as established by Project Decision, can help the town to strengthen its weak spots, improve its appearance and facilities, and help put it into a more competitive position to attract new industry.

Tax Incentives — *from p. 48*

count. This provision would limit tax depreciation to methods that can be justified on the basis of what is actually happening to a taxpayer's plant. Under generally accepted accounting principles, depreciation recorded on a corporation's books of account must be determined by depreciation methods which can be justified on a rational basis. It follows that any depreciation methods which are not sound for accounting purposes should not be permitted for tax purposes. I believe such a provision is necessary for the proper determination of taxable income and for the protection of the government's tax revenues."

Conclusions

There is no question that the Administration's investment credit proposal was not only totally unsound for the non-regulated segment of the economy, but that it would have been a tremendous problem to the regulated public utilities. Fortunately the Administration saw to it that the utility industry was specifically excluded from any participation in the so-called "incentives" which the Administration had proposed. This is one of the few instances where the obvious anti-utility bias of the Administration has worked in favor of the private electric utilities.

Had the electric utilities been included in the Administration's tax incentive, they would have been faced with the problem of tax reductions arising from the capital investment credit. Obviously, no claim could have been made that the tax credit was a mere deferral of taxes. Any reduction in taxes due to the investment credit would have been a permanent reduction—just as if the tax rate had been lowered—consequently any Commission would have been justified in reducing rates to customers based on the decreased tax liability. The faster the rate of growth, the greater the reduction in taxes, the lower the revenue requirements. All this would happen at a time when a growing utility would need all the needed return to support the additional outside capital to provide for the expansion.

On the other hand, when utilities are not expanding—for example in a period of depression—the low rates which had been set by prior period of rate reductions obviously could not be raised.

Finally, there will be no practical way of determining the cost of service or the future revenue requirements of a utility under this method of so-called tax relief.

CEREAL CROPS . . .

(Continued from page 31)

pipeline is still pouring out the as and water mixture into anothe lagoon, which next year maybe, wi be seeded and become as productiv as its cultivated neighbors.

The process is continuous, and is expected that ten acres of mars will be reclaimed every year. Th lagoons are to be extended into th area of Flint Borough, but it is n expected that any difficulty wi arise in pumping the ash the longe distance demanded.

In earlier experiments of this na ture, a top covering of soil and sew age sludge to varying depths wa used, and quite remarkable gras yields were obtained in some case as much as 40 tons per acre fresh-weight grass was obtaine from five harvests under plot cond tions using one variety of sludg These plots, established in 1951, sti continue to yield grass although n manures have been added sinc their initiation.

At Connah's Quay top soil wa not available on the site. The seed ing operation, including seed an labor, is estimated to have co about £100; the importation of soi might easily have involved an ex penditure of £10,000.

WHAT THE CUSTOMER . . .

(Continued from page 27)

get together and discuss this wit your fellow representatives? Fin out what needs to be offere through surveys in your own grou Set up some "Aids" programs, wel get to know each other better. On last thing, after you have helpe and think you have solved a pro lem for a particular plant enginee I would suggest you check the r sults in about six months. Rea praisal of your solution is impo tant to you and an indication to th plant engineer that you are a "sin cere person." I guess we all kno we don't find many sincere peop in the field today.

It has been a pleasure to give yo some of my opinions. If I've left yo with just one idea on improvin customer relations, I feel that have accomplished my aim.

CALENDAR OF EVENTS

Sept. 5-8—Woodward Governor Prime Mover Control Conference, Rockford, Ill.

Sept. 6-8—AIEE-IRE-ISA Joint Nuclear Instrumentation Conference, North Carolina State College, Raleigh, N. C.

Sept. 10-13—Rocky Mountain Electric League Fall Convention, Jackson Lake Lodge, Moran, Wyo.

Sept. 11-15—16th Annual ISA Instrument-Automation Conference & Exhibit, Biltmore Hotel, Los Angeles, Calif.

Sept. 12-14—Eastern Wood Pole Conference, Syracuse University, Syracuse, N. Y.

Sept. 14-15 — AIEE-ASME Engineering Management Conference, Hotel Roosevelt, New York, N. Y.

Sept. 14-16 Public Utilities Association of the Virginias Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

Sept. 20-21—P.I.P. Workshop Conference, Brown Palace Hotel, Denver, Colo.

Sept. 20-22—NELPA Annual Business Meeting, Sheraton-Portland Hotel, Portland, Ore.

Sept. 20-22—Annual National Electric Farm Power Conference, Leamington Hotel, Minneapolis, Minn.

Sept. 21-22—MVEA Accounting Conference, Sheraton-Jefferson Hotel, St. Louis, Mo.

Sept. 24-27—AIEE-ASME National Power Conference, St. Francis Hotel, San Francisco, Calif.

Sept. 24-29—National Technical Conference, Hotel Chase-Park Plaza, St. Louis, Mo.

Sept. 25-27 — EEI Meter and Service Committee Meeting, Leland Hotel, Springfield, Ill.

Sept. 25-27 — EEI Industrial Relations Roundtable Conference, Drake Hotel, Chicago, Ill.

Sept. 25-28—Industrial Building Exposition & Congress, New York Coliseum, New York, N. Y.

Sept. 27-28 — PEA Annual Meeting, Bellevue Stratford Hotel, Philadelphia, Pa.

Sept. 27-29—MVEA Sales, Rural & Home Service Conference, President Hotel, Kansas City, Mo.

Sept. 28-29 — SEE Accounting Section Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 2-3—Iowa Utilities Management Conference, Hotel Ft. Des Moines, Des Moines, Ia.

Oct. 2-3 — Tennessee Valley Public Power Association Power Use Section Meeting, Hotel Peabody, Memphis, Tenn.

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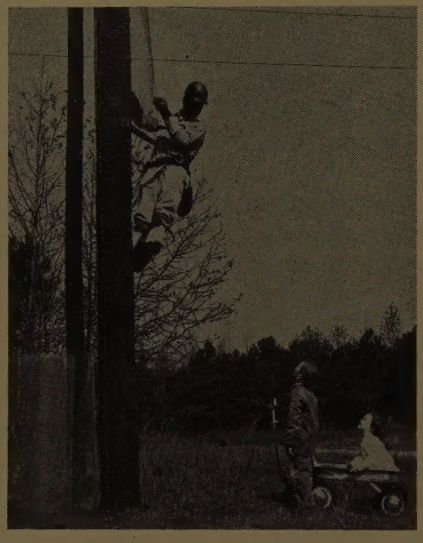
Pole Protection

A woven steel wire mesh, produced by U. S. Steel's American Steel and Wire Division, today is helping to solve a knotty problem for some of the nation's electric power companies and gives promise of saving sizeable sums in the cost of replacement poles.

Known in the trade as industrial wire cloth, the mesh has been used in wooded areas in the South and other sections to combat forays by woodpeckers which for years have played havoc with utility poles. With installation of the ½-in., 19-gage wire mesh, galvanized for long life, the onslaught is ended.



"This is for the birds," explains a lineman to two inquisitive youngsters in Birmingham, Ala. He's wrapping a power pole with woven steel wire mesh as protection against marauding woodpeckers.

Longer Lengths Of Conductor Available . . . .

Reynolds Metal Co. recently shipped reels of 3/0- and 1/0-ACSR (6/1) to Utah Power and Light Co., Salt Lake City, in lengths of 12,000 and 14,000 ft with the reels weighing 2770 and 2033 pounds, respectively. These exceptionally long lengths (approximately 50 percent longer than normal) were produced and packaged on special 50-in. metal reels at Reynolds' Listerhill, Ala., plant, according to Samuel I. Manning, Reynolds electrical market manager. Normally, however, these lengths will be furnished on non-returnable wooden reels in accordance with standard industry practices, Manning mentioned.

Gas Cleaning Efficiency Recorded At 99% For Penelec's Seward Station . . . .

Efficiencies in excess of 99 percent in collecting fly-ash particles from boiler gases have been recorded by Pennsylvania Electric Co. in recent tests at the Seward Generating Station. Two electric precipitators, engineered and manufactured by Research-Cottrell, Inc., help to achieve this efficiency by removin more than 100 tons of the finer fly-ash particles daily Mechanical dust collectors remove larger particle before the boiler combustion gases enter the precipi tators which have guaranteed efficiencies of 98 per cent in removing even sub-micron particles of fly-ash Pulverized-coal-fired boilers No. 12 and 14 at Sewar produce 600,000 lbs of steam per hr and are equippe with two smoke cleaning precipitators designed t handle 360,000 cfm of waste gases.

Thawing Frozen Coal Cars . . . .

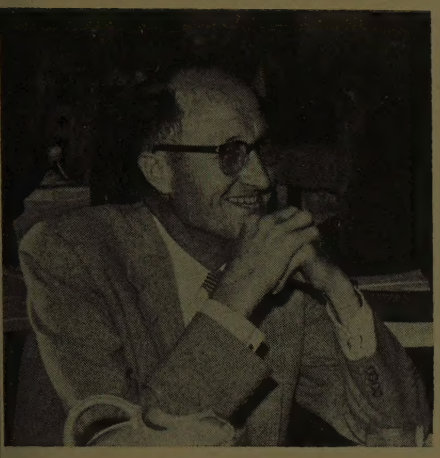
In cold weather the coal often freezes in railroa cars and must be thawed before the automatic un loading equipment can do its job (turning the ca upside down to empty it). One way to thaw the coa it to hold oil-burning torches under the bottom an on the sides of the car, a slow and unwieldy process In severely cold weather it might take more than a hour to loosen coal in a tightly frozen car.

To speed up and improve unloading operations, a infrared heating system has been installed at Niagar Mohawk Dunkirk Station. Banks of calrod heatin units on both sides and underneath the car thaw th frozen coal in less than ten minutes. The units go o automatically, actuated by a photo-electric cell, a the car enters the building. They go off after a pre

determined period based on weather conditions. more heat is needed for a particular car, an operato can adjust the system accordingly.

The new method enables the station to unload u to 60 cars daily—regardless of the weather—quickl neatly and efficiently. Maximum load for the heatin units is 2,200 kw although they operate at 75 percen of this figure in average cold weather.

LIGHT AND POWER LINES



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THE MAGAZINE OF ELECTRIC • UTILITY TECHNOLOGY

Accent the Glamorous! —Electric Utilities are not really lacking in glamor appeal—they just give that impression by not shouting long and loud about the glamor they *do* have!

How about magnetohydrodynamics—that alone should have more exciting appeal than just plain old electronics. And that's just one of four new "exotic" energy-conversion concepts. Consider also the almost limitless possibilities in the field of computer-directed automation.

Surely these and many other bold new technological advancements can be given sufficient dramatic emphasis to successfully challenge the able young technical and management prospects the electric light and power industry so sorely needs.

Go Ahead, Or Slip Back— The forward march of progress in the electric-utility field carries along with it a continuous challenge to utility executive and supervisory personnel to keep abreast of technological developments.

Since most of these key utility people have little opportunity to return to college or to take special training to update themselves, they are largely dependent on the technical press to keep informed.

Of course this is particularly true in the more highly specialized areas of utility operations. Developments in these areas come so thick and fast that they even evolve a special language of their own. As a case in point, consider the field of computers, where we find such baffling terms as "flip-flop," "buffer," "bit," "nor element," "parity check," "random access memory," and the like.

Whatever his job assignment, the utility reader can look to the technical press for a continuing refresher course which cannot be had any other way—all for little or no cash outlay. Time, systematically allocated, is the only thing he really needs.

Quoting B. C. Forbes, who founded *Forbes Magazine:* "It can be accepted as an axiom that the man who has no time to read about business has no time to succeed in business."

Through the pages of EL&P, it is our constant endeavor to bring to our readers the kind of information that will enable them to keep up with the parade of new technological developments that most directly concern them.

Costs Down; Lumens Up— Our industry's constant endeavor to provide more for the money has resulted in still another important step forward, this time in the field of fluorescent lighting.

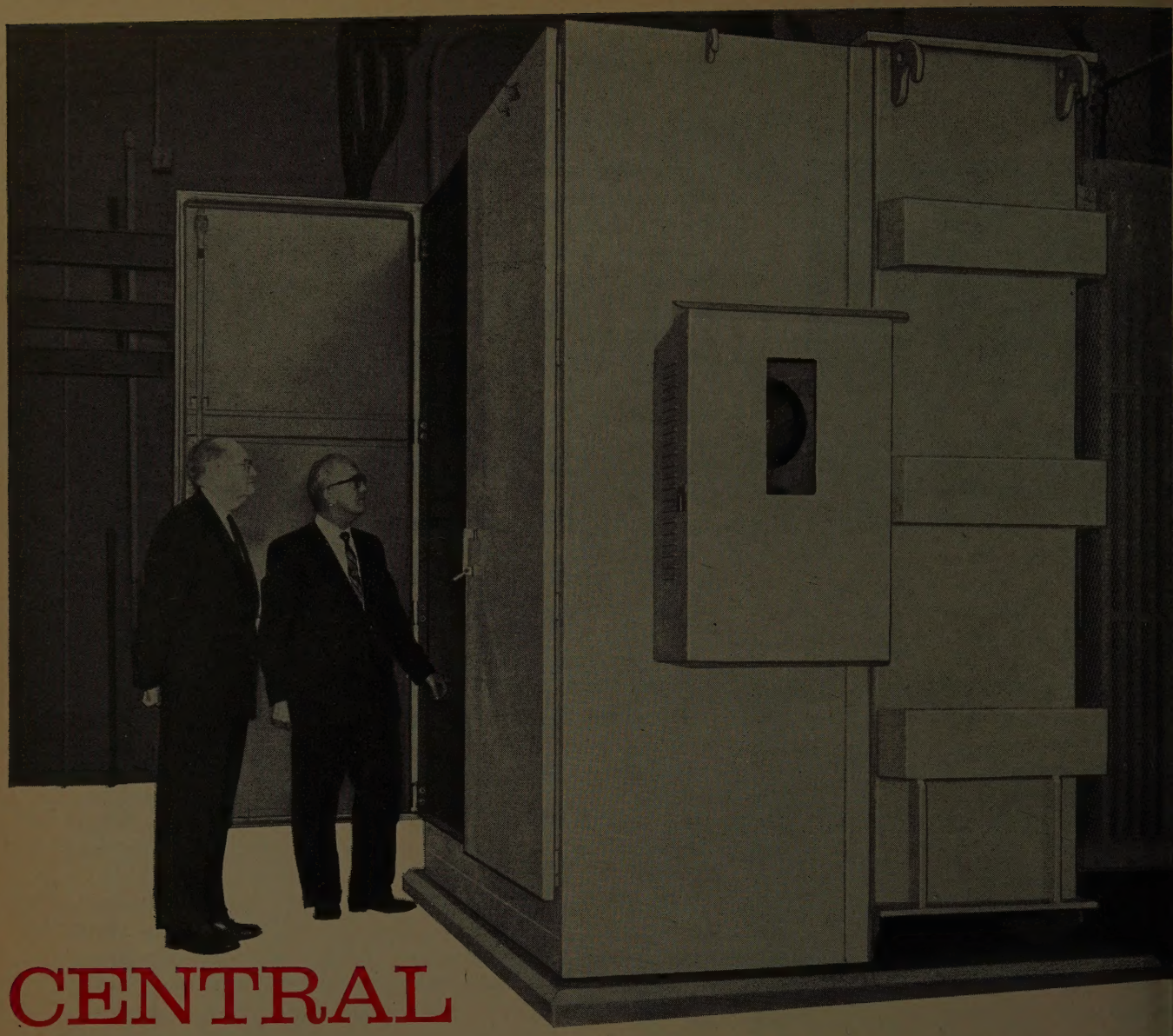
By way of illustration, the same system that provided 58 ft-c with the 1956 vintage of 40-watt lamps can provide 74 ft-c with a new lamp just introduced by G-E.

This new lamp carries the same list price as G-E's 40-watt unit did 20 years ago. Moreover, it not only produces half again as many initial lumens but has three times the rated life.

With an estimated U. S. investment of over $4-billion in 274-million 40-watt sockets, it is evident how much more for the money is in the offing—all in keeping with the tradition of our industry.

L. W. Garrett

Publisher and Editor



O. B. Ashmore, Senior Engineer, and Lowell Baker, Department Head, Operating Division, for Dallas Power & Light Company, inspect newly installed Pad Mounted Central power transformer.

CENTRAL 1500 KVA Pad Mounted Transformer

NOW IN SERVICE ON DALLAS POWER & LIGHT COMPANY'S SYSTEM

This Pad Mounted power transformer, with its neat appearance, compact size, and tamper proof features, solved a space problem for Dallas Power & Light Company. The Central unit shown above is a 1500 kva, 3-phase power transformer rated 13200 delta primary to 240 delta secondary. It is complete with a free standing outdoor enclosure, with two hinged doors enclosing bushings, lightning arresters, high voltage fuses, pothead, gauges, valves and current transformers.

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